

Water availability for the next 50 years

The Northern Region Sustainable Water Strategy looks at how much water may be available over the next 50 years for agriculture, industry, urban use and the environment. By understanding what our water needs and resources look like over the long term, we can make informed plans for the future.

The Northern Region Sustainable Water Strategy Discussion Paper has identified the following pressures and risks to water resources and water use:

- ▾ Over-allocation of water resources.
- ▾ Significant land use change and events.
- ▾ Population growth.
- ▾ Water quality issues, including salinity.
- ▾ Climate variability, including drought.
- ▾ Climate change – a key contributor to changes in water resources across the Region.

Over-allocation

The Living Murray process initiated by the Murray Darling Basin Commission identified that the amount of water being taken from rivers and aquifers in the Northern Region is affecting the long-term availability. Over-extraction doesn't just mean that the environment suffers – it also leads to water quality issues that, if left unchecked, will affect how much water we can take. The Murray-Darling Basin Cap stopped any more water use licences being granted, but more water is still being allocated than the region can sustain.

Land use change

Landscape and land use changes can have direct and indirect effects on the quality and quantity of water available. Changes include timber plantations and orchards replacing annual cropping and grazing, more small dams being built on farms and lifestyle properties, and widespread bushfires as occurred in the summers of 2003 and 2006.

Population growth

More people means more water is needed to supply households and industry. The Northern Region's current population of 529,000 is anticipated to increase to about 696,000, or 30 per cent more, by 2055.

Water quality

The lower reaches of rivers within the Murray-Darling Basin are naturally salty, highly turbid and rich in nutrients. Human activities contribute additional nutrients and salts that in turn have significantly affected agricultural production, infrastructure and environmental values. While land use has been a significant contributor, the extraction of water for consumptive use can also exacerbate existing water quality issues.

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Climate variability

Over the past 10 years, rainfall across almost all of Victoria has been well below average. By managing the current reductions in seasonal rainfall and associated streamflows, the Northern Region Sustainable Water Strategy will also better position the Region to manage climate change in the long term.

Climate change

Climate change is likely to pose the biggest risk to the region's water supplies for the future.

Potential impacts include:

- ↳ Less rainfall in catchments.
- ↳ Longer, more frequent and more extreme droughts.
- ↳ More hot days that will dry out catchments and further reduce streamflow.
- ↳ Increased risk of bushfires.
- ↳ More severe flood events, more often.

This Strategy is the first time that the impact of climate change on future water availability has been estimated, collated and integrated across systems throughout northern Victoria.

Forecasting potential water availability

Water availability forecasts for the Region to 2055 provide information to support long-term planning and decision-making for individuals, communities and governments.

The Discussion Paper looks at low, medium and high climate change impact scenarios and also includes projections of what would happen if the drought of the past 10 years continued:

Table 1 Potential reduction in total inflows for the River Murray and its tributaries (compared to the long-term average)

River Basin	Streamflow impact in 2055 under each CSIRO climate change scenario			D - Impact experienced over past 10 years
	A - Low	B - Medium	C - High	
Kiewa	-5%	-19%	-32%	-16%
Ovens	-6%	-24%	-41%	-29%
Broken	-7%	-31%	-51%	-48%
Goulburn	-7%	-25%	-43%	-38%
Campaspe	-9%	-31%	-54%	-69%
Loddon	-10%	-34%	-58%	-72%
Victoria's share of the Murray system	-6%	-22%	-40%	-38%

Impacts of less water

Urban water users

Urban communities are impacted either directly or indirectly by all the risks outlined in the Discussion Paper. For instance, the region's growing population is a key risk for urban supplies, as it means more households and industry will be requiring water in the future. The Northern Region's current population of 529,000 is expected to increase to about 696,000 by 2055. Increases to 2031 will be chiefly due to growth in larger urban centres such as Bendigo (3 per cent), Wodonga (1.6 per cent), Echuca (1.6 per cent), Yarrawonga and Cobram (1.4 per cent), Wangaratta (1.3 per cent), Shepparton (1.2 per cent) and Mildura (1.1 per cent).

Climate change for townspeople may result in a future with tighter water restrictions, more often. What this may mean can be gleaned from the experiences of the present drought, where the prolonged dry conditions have triggered limits or bans on outdoor use. Urban restrictions in northern Victoria have had a significant economic impact on some businesses, including carwash, turf and nursery industries. They have also had socio-economic impacts on rural towns, with many sporting grounds and swimming pools closed.

Risks to water resources can also have an indirect impact on urban communities, through such linkages as how climate change affects surrounding primary producers or how risks to river health can in turn affect tourism, recreation and heritage and social values.

Rural water users

The impact of climate change on irrigators can be measured by modelling how reduced streamflows might affect high-reliability water shares in the Northern Region's major regulated systems. A medium range climate change scenario or a continuation of the past 10 years of low inflows would result in the number of years with full allocations being reduced, while the number of years with zero allocations would increase. The table below shows the possible impacts:

Table 2 Predicted impact of medium climate change and a continuation of the past 10 years low inflows on high-reliability water shares

River system	Indicator	Scenarios		
		Long-term average	Medium climate change	Continuation of the past 10 years low inflows
Murray	No. of years with full allocations	99 out of 100	85 out of 100	81 out of 100
	Lowest allocation	88%	0%	0%
	No. of years with zero allocations	-	<5 out of 100	<5 out of 100
Goulburn	No. of years with full allocations	97 out of 100	77 out of 100	43 out of 100
	Lowest allocation	57%	16%	8%
	No. of years with zero allocations	-	-	-
Campaspe	No. of years with full allocations	98 out of 100	96 out of 100	65 out of 100
	Lowest allocation	53%	28%	5%
	No. of years with zero allocations	-	-	-
Loddon	No. of years with full allocations	95 out of 100	77 out of 100	37 out of 100
	Lowest allocation	47%	0%	0%
	No. of years with zero allocations	-	<5 out of 100	<5 out of 100
Broken	No. of years with full allocations	90 out of 100	78 out of 100	61 out of 100
	Lowest allocation	0%	0%	0%
	No. of years with zero allocations	<5 out of 100	<5 out of 100	<5 out of 100

Environment

River and wetland health in the Northern Region are under pressure from a range of issues, including over-allocation, drought and climate change.

Climate change modelling indicates that the actual reductions in streamflows experienced over the past 10 years are (for most systems) similar to or greater than the reductions expected in 2055 as a result of medium to high climate change scenarios. It is also likely the environment's share of water will be disproportionately reduced compared with the share available for human use. This is because the majority of the environment's water comes from spills from reservoirs, and spills will be smaller and less frequent with climate change.

The environmental impact of climate change varies from system to system, with the western rivers systems likely to be the worst affected (see Table 3). For example, under a medium climate change scenario, by 2055 environmental flows could be reduced by 32 per cent, or 44 per cent if the past 10 years of low inflows were to continue.

Changes in seasonal and other flow patterns are also important. For example, reduced flood frequency would impact on plant and animal populations because they need water to survive (like fish, frogs and trees) or because they need floods to breed (like birds such as egrets and spoonbills).

Table 3 Potential reduction in environmental flows for the major regulated systems in the Northern Region

River system	Water availability scenario			Continuation of the past 10 years low inflows
	Long-term average	Medium climate change at 2055		
Murray	6,595 GL	4,486 GL	(-32%)	3,667 GL (-44%)
Broken	186 GL	100 GL	(-46%)	64 GL (-66%)
Goulburn	1,580 GL	971 GL	(-39%)	704 GL (-55%)
Campaspe	163 GL	84 GL	(-49%)	26 GL (-84%)
Loddon	110 GL	59 GL	(-38%)	21 GL (-73%)

Planning for the future

Deciding what additional action needs to be undertaken to manage potential impacts on water availability is a primary objective of the Northern Region Sustainable Water Strategy.

The water availability scenarios used in the Northern Region Sustainable Water Strategy Discussion Paper show there may be a gradual reduction over time, resulting in modest or substantial changes over the 50 years. The worst-case scenario is that the extreme conditions experienced over the past 10 years could continue indefinitely. More about potential responses to manage the Northern Region's water future can be found in Fact Sheet 4.