

Appendix B - COLIBAN SYSTEM NORTHERN



Figure 1: Coliban Northern showing water sources.

System Overview

As of 30 June 2018, Coliban System Northern (Coliban Northern) services 45,274 residential connections and 3,632 non-residential connection. Some customers are delivered both potable and recycled water. It also services 715 rural licences with a base entitlement of 5,698.2 ML. Rural customers are delivered non-potable water.

The Coliban Northern comprises two independent potable water supply systems (Bendigo and Heathcote) and a number of rural channel supplies.

- The Sandhurst Reservoir at Bendigo receives raw water from the Coliban Headworks Storages, GMW Campaspe system (Lake Eppalock) and the GMW Goulburn system (Waranga Western Channel). Raw water from the Coliban Headworks Storages is transferred by gravity via the 69 km long Coliban Main Channel. Water is pumped from Lake Eppalock via the 27 km Eppalock Pipeline (Eppalock to Sandhurst Reservoir) which is part of the Goldfields Superpipe, and also pumped from the Waranga Western Channel at Colbinabbin via the 47 km leg of the Goldfields Superpipe. Water is treated at the Bendigo WTP located at Sandhurst Reservoir and supplied to Bendigo and surrounding townships including Axedale, Strathfieldsaye, Huntly, Maiden Gully, Marong, Raywood and Sebastian.
- The Caledonia Reserve in the Heathcote – Tooborac System receives raw water directly from Lake Eppalock or from the Eppalock to Sandhurst pipeline. The water is treated at the Heathcote WTP and supplied to the townships of Heathcote and Tooborac.

The main rural channels are Cockatoo Hill, Specimen Hill, Emu Valley (supplied off Eppalock Pipeline), Lockwood, Jackass Flat, Ascot, Axe Creek, and directly off the Eppalock Pipeline.

Water Resources and Demand

In most years our Coliban Headwork Storages have adequate reserves to meet Coliban Systems Northern and Southern demands. If the water is not released from storages, Coliban Northern system relies entirely on external sources through water entitlements (bulk entitlement and water shares) managed by Goulburn Murray Water.

The urban and rural demands for 2017-18 slightly increased from 2016-17 demands.

Table 1: Rural channel usage for 2017-18.

System	Channel	Total Licence Volume (ML)	Total Usage (ML)	No. of Licences	No. of Licences Supplied	% of Licences Supplied
Ascot	Ascot	755.9	306.9	37.0	20.0	54%
	Ellesmere	157.6	97.6	45.0	34.0	76%
	Goornong	352.2	229.8	14.0	12.0	86%
	Huntly	18.6	1.4	2.0	1.0	50%
	White Hills	257.7	156.4	7.0	6.0	86%
System Total		1,542.0	792.1	105.0	73.0	70%
Axe Creek	Axe Creek	346.2	104.5	68.0	46.0	68%
	Kangaroo	11.4	0.0	2.0	0.0	0%
System Total		357.6	104.5	70.0	46.0	66%
Cockatoo Hill	Cockatoo Hill	124.4	66.8	31.0	22.0	71%
	Neilborough	31.5	22.4	10.0	8.0	80%
	Raywood	299.3	218.8	65.0	52.0	80%
	Sebastian	59.7	12.7	7.0	5.0	71%
System Total		514.9	320.7	113.0	87.0	77%
Emu Valley North	Emu No 1 (Eppalock)	81.6	59.3	14.0	13.0	93%
	Emu No 2 (Eppalock)	153.0	34.1	17.0	8.0	47%
System Total		234.6	93.4	31.0	21.0	68%
Eppalock Pipeline	Eppalock Pipeline	827.3	422.3	81.0	75.0	93%
System Total		827.3	422.3	81.0	75.0	93%
Jackass Flat	Ironstone	1.0	0.7	1.0	1.0	100%
	Jackass Flat	0.0	0.0	0.0	0.0	0%
	Sparrowhawk	0.0	0.0	0.0	0.0	0%
System Total		1.0	0.7	1.0	1.0	100%
Lockwood	Lockwood	582.5	158.4	117.0	86.0	74%
	Marong	251.8	119.6	30.0	23.0	77%
	South Lockwood Pipeline	397.3	192.2	46.0	45.0	98%
	Wilsons Hill	234.9	92.8	31.0	27.0	87%
System Total		1,466.5	563.0	224.0	181.0	81%
Specimen Hill	Maiden Gully	357.2	190.5	43.0	29.0	67%
	Myers Flat	100.2	60.1	16.0	10.0	63%
	Specimen Hill	296.9	64.7	31.0	20.0	65%
System Total		754.3	315.3	90.0	59.0	66%
Northern System Totals		5,698.2	2,612.0	715.0	543.0	76%

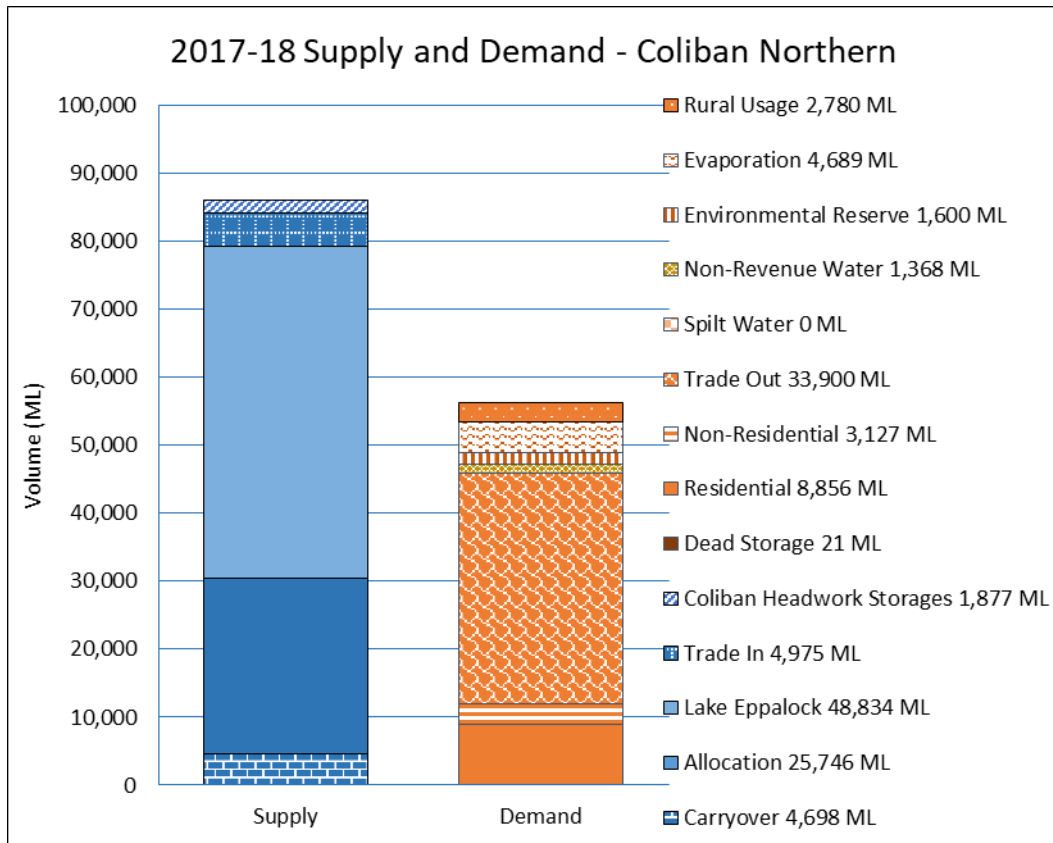


Figure 2: 2017-18 Supply and Demand for the Coliban Northern.

In 2017-18 the demand for the Coliban System Northern was less than the estimated demand range.

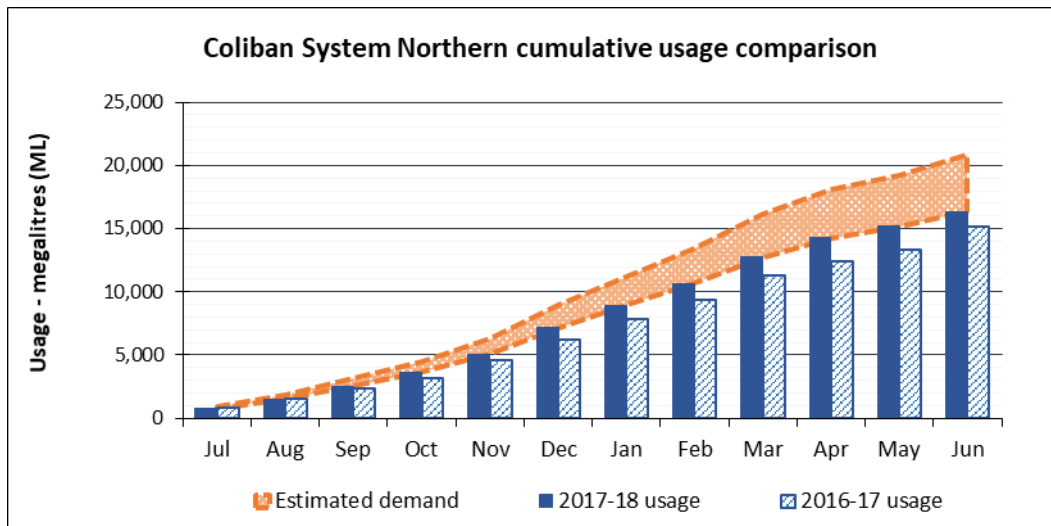


Figure 3: 2017-18 cumulative water usage for Coliban Northern compared with the same period last year and estimated demand. The usage and demand include urban, rural and losses.

Resource Status

With high volumes in storage and allocations at 100% for Campaspe High Reliability Water Shares and 37% for Goulburn High Reliability Water Shares, restrictions are highly unlikely for the next 12 months.

Table 2: Supply and demand.

System	Primary Supply Secondary Supply	Supply ¹ 1 Oct' 2018	Demand 'dry weather'	Reserve Status
Coliban Northern	Coliban Headwork Storages Lake Eppalock, Waranga Western Channel	69,422 ML	27,994 ML	>24 months

Note 1: Includes allocation received to date and carryover from 2017-18.

The prolonged dry weather that was experienced during the Millennium Drought had significant impact on the available water resource. During this period the storage levels were critically low (Eppalock was 1% of the capacity in June 2007) and the restrictions level reached to Stage 4 on two occasions (2004-05 and 2007-08). Building the Superpipe in 2007 allowed for the sourcing of water from the Goulburn system to ease the pressure, particularly in Bendigo and Heathcote. A large volume of water entitlements and shares were bought during this period.

The heavy rainfalls and very high inflows experienced during 2010-11 filled all the storages. The rainfall and runoff during 2010-11 are the highest on record.

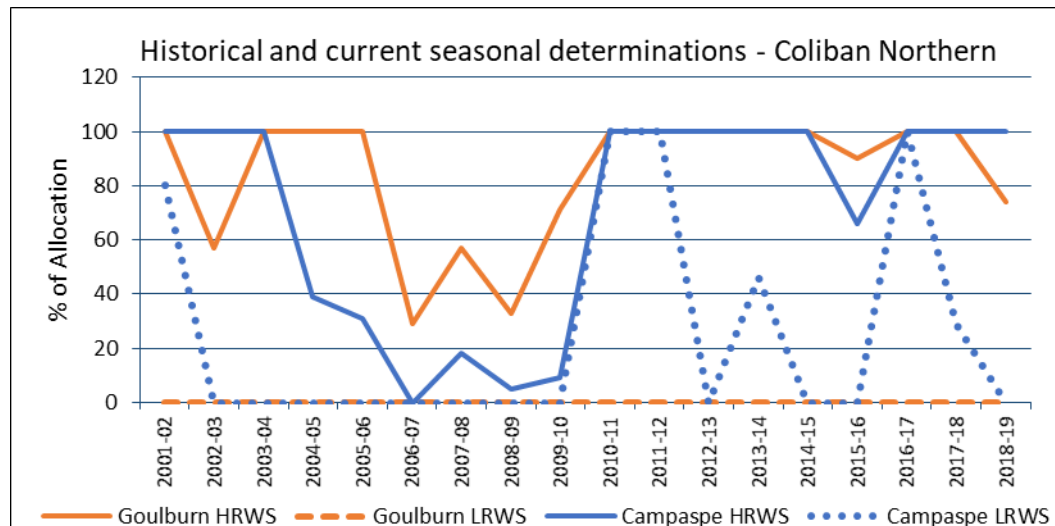


Figure 4: Historical and current season determinations for the Coliban System Northern.

Forward Outlook

Our resource position remains positive with all sources of supply for Coliban Northern at or close to 100%. Even without further allocations or inflows we hold over three years of supply at present. With a potentially dry end to spring and into summer the 2018-19 estimated dry weather demand, 29,506 ML, may be higher.

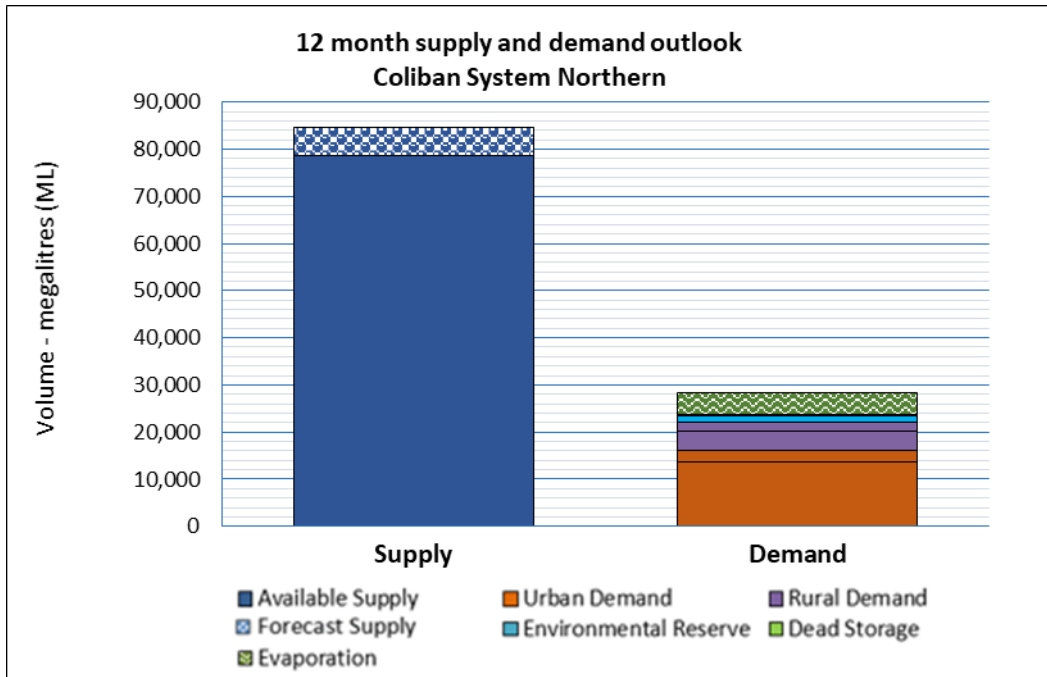


Figure 5: Raw water 12 month supply and demand outlook for the Coliban Northern System.

Actions

Develop a pumping trigger to coincide with the volumetric trigger level of Coliban System

Southern: Once the volumetric trigger level is reached for the Coliban Headworks Storages, releases for the Coliban System Northern cease. At this point pumping from external sources would commence to supply Coliban Northern. However pumping can commence ahead of the trigger being reached to preserve reserves for Coliban Southern.

Lake Eppalock Hydroelectricity Project: 'For Country and the Environment'

Coliban Water will progress the development of a business case for the construction of a hydroelectricity plant at Lake Eppalock. The releases into the Campaspe River downstream of Lake Eppalock would be used to power the turbines. The plant would allow greater utilisation of our water resources in Lake Eppalock without the penalty of high pumping costs. If constructed it would provide opportunities to deliver raw water to Bendigo via the lower Coliban River thus achieving an ecological and cultural benefit at minimal cost.

Coliban Water has continued to engage with stakeholders and customers in relation to the Urban Water Strategy (UWS). Detailed analysis on each system will commence during the latter part of 2018-19.