



Lake Wartook Operating Rules

Wartook Reservoir is located on the MacKenzie River in the central Grampians. It is the primary source of supply for Horsham and Natimuk and a secondary source of supply to System 6 of the Wimmera Mallee Pipeline (WMP). The reservoir also provides important flows to the environment as outlined below.

Water for Horsham is released into the upper MacKenzie River and then diverted from the Dad and Dave Weir via the Mt Zero Channel to the Mt Zero balancing storage.

Water for Supply System 6 customers of the WMP is released into the mid MacKenzie River and diverted from Distribution Heads via the Moora Channel to two balancing storages at Brimpaen. When volumes are available Moora Moora Reservoir is the primary source of supply to the Brimpaen storages.

Wartook is also used to sustain critical aquatic habitats along the MacKenzie River, where platypus and a recently discovered bottlebrush are found, and water the Burnt and Bungalally Creeks.

Wartook has an efficient catchment of about 75 km² contained entirely within the Grampians National Park. This catchment yields an average of about 26,000 ML each year, with most inflows typically occurring between June and October.

Lake Wartook has a capacity of 29,300 ML at Full Supply Level (FSL) which is 0.15 metres below the spillway crest. This means that when Wartook is at its FSL, an additional 1,400 ML is required before it will spill.

To assist in managing reservoir levels, a variable operating level is adopted between June and October of each year. This provides a maximum of 8,000 ML of air space in June, which is progressively reduced with the objective of having the reservoir at its FSL by the end of October.

This target curve (see Figure 1) is intended to provide some attenuation of flood flows to allow controlled harvesting of this water downstream at Distribution Heads. It also serves the purpose of reducing the frequency of road closures in the Zumsteins area of the National Park. Wartook Reservoir can be expected to be isolated during major rainfall events.

There are currently no rules for how water may be released prior to the June target level. Historically, releases to the Domestic and Stock channel system would have drawn down Wartook levels, however this is no longer the case. Instead it is proposed to introduce a revised target curve which will provide a means to release water, if necessary, in the lead up to the inflow season. This is shown in Figure 1.

Water may be released from Wartook up to the safe maximum rate of 500 ML/day to maintain target levels. When inflows exceed this rate of controlled release, levels within the reservoir will increase and a spill may occur. Wartook Reservoir has a primary spillway at the west end of the embankment and a secondary spillway at the east end of the embankment. Spills from Wartook Reservoir pass to the MacKenzie River. Figure 2 shows Lake Wartook in relation to nearby channels and reservoirs.



The regulating structures at Distribution Heads are used to transfer modest flows of up to 200 ML/day (sometimes as much as 500 ML/day for short periods) down Burnt Creek. Distribution Heads, however, provides no effective control of flows during times of major flood, with flood flows split between the MacKenzie River and Burnt Creek in essentially natural proportions.

Wartook Reservoir is recognised as having high recreational value and is particularly renowned for its fishing. Water released to the river down stream also provides for tourist attractions at the MacKenzie falls and Zumsteins areas within the Grampians National Park.

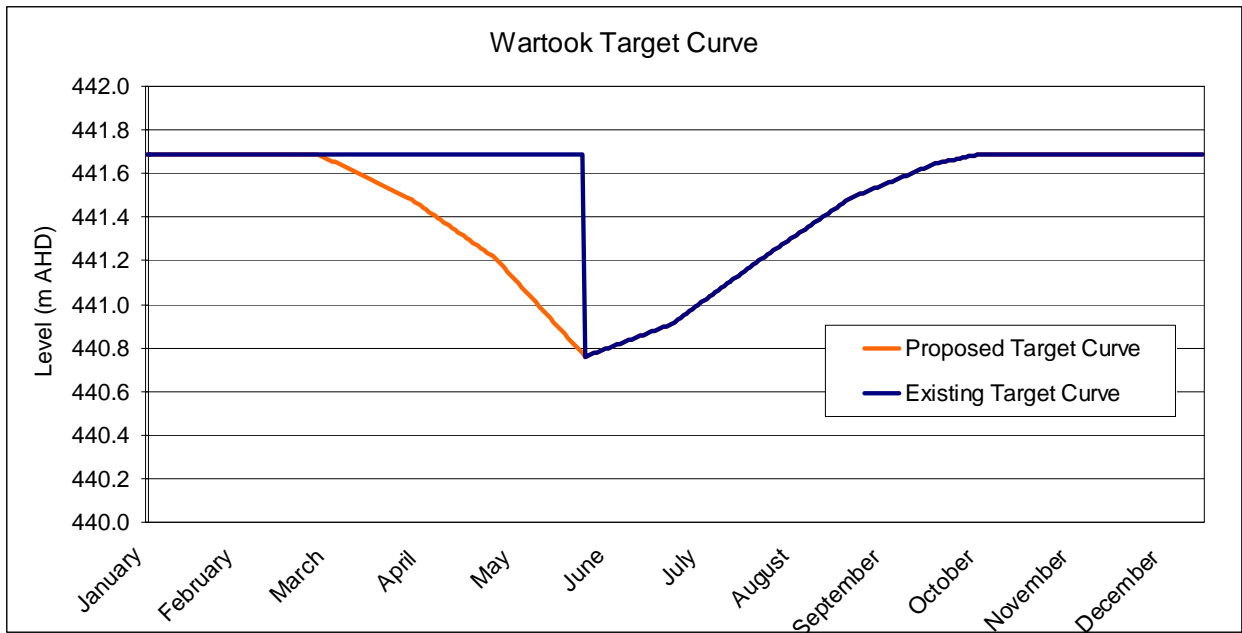


Figure 1: Wartook Target Curve

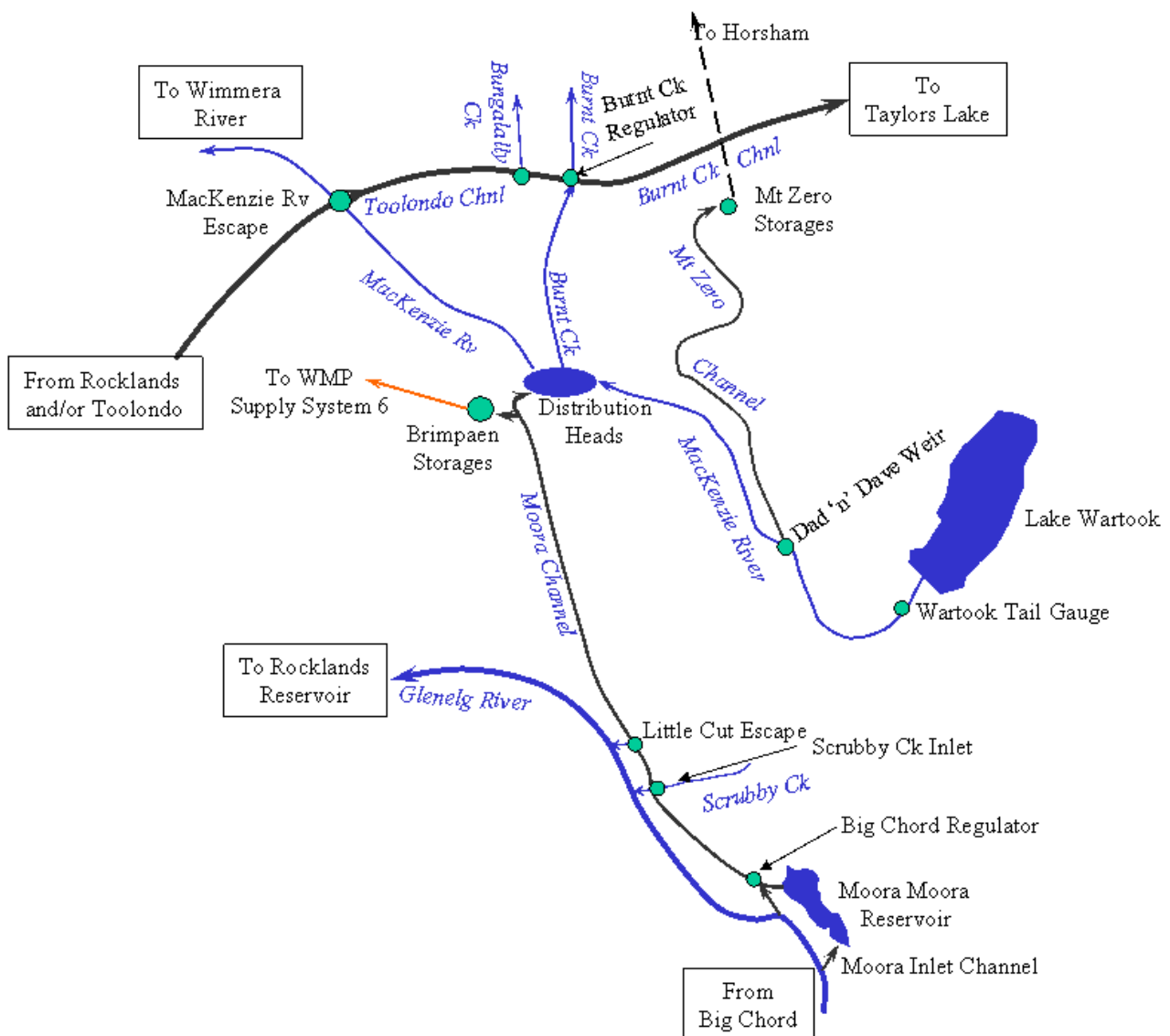


Figure 2: General layout of Lake Wartook

Overview of January 2011 Flood Event

Wartook Reservoir commenced the January 2011 event about 2,700 ML below its FSL, or about 4,000 ML below spilling. This air space was quickly filled during the January 2011 event, with over 200 mm of rain received over a short period which saw a peak inflow of 7,200 ML/day being recorded into the reservoir. Releases of 500 ML/day were made via the outlet structure. Inflows far exceeded the capacity of the outlet structure, resulting in the reservoir spilling. The spill was recorded to peak at around 3,500 ML/day. Wartook Reservoir therefore attenuated the flood peak to below half of that which would have occurred if the reservoir was not there.

Following the January 2011 event, questions have been raised about the impact of lowering the existing FSL and further reducing the height of the variable operating levels in place during winter. The demands supplied from Wartook include Horsham, Natimuk, WMP Supply System 6 (with Moora) and important environmental flows. This makes this reservoir one of the most heavily committed of all the headworks reservoirs. Maintaining Wartook at its FSL when possible is therefore seen as critical for water supply security.

It is quite unusual for Wartook to be full at the beginning of February each year. It is possible that some reduction in level could be accommodated at this time of year. A review of the Wartook target curve should occur in conjunction with the review of reservoir operating rules required for the Bulk Entitlement implementation process in 2013.

| Wartook Reservoir Facts and Figures | |
|--|-----------------------|
| Full Supply Level | 441.68 m AHD |
| Full Supply Volume | 29,300 ML |
| Primary Spillway Level | 441.83 m AHD |
| Primary Spillway Length | 175 m |
| Primary Spillway Capacity | 1,500 ML/d |
| Secondary Spillway Level | 442.10 m AHD |
| Secondary Spillway Length | 127 m |
| Secondary Spillway Capacity | 25,056 ML/d |
| Maximum Discharge | 500 ML/d |
| Catchment Area | 75 km ² |
| Surface Area when Full | 10.31 km ² |
| Major Tributary | MacKenzie River |
| Average Annual Inflow (2009) | 26,000 ML |

Current Operating Rules

- > To operate to the maximum operating level throughout the year except during those months where the target curve applies.
- > To operate to the target curve during the months of June to October inclusive.

Proposed Operating Rules

- > To operate to the FSL throughout the year except during those months where it is being operated to the target curve. *
- > To introduce additional target levels during March, April and May and include these as part of the target curve that already exists for June to October inclusive (refer to Figure 1 above).

Glossary

AHD – Australian Height Datum, used for altitude measurement. Zero is the mean sea level for the period 1966-68.

Freeboard - Height between normal maximum operating level and the top of the bank or spillway.

Full Supply Level - The normal maximum operating level of a reservoir behind a dam.

* – these rules are not subject to negotiation as they are necessary for water supply purposes.

Reference: Grampians headworks system fact sheet