What's that about?

Why lake levels change Lake Barrington

Produced May 2012

Lake Barrington was created in the 1970s when Devils Gate Dam was constructed. The lake was created to store water for hydropower electricity generation.

Lake Barrington is a run-of-river storage in the Mersey-Forth hydro generation scheme. Run-of-river means the lake has a small storage volume relative to the inflows it receives. Put simply, water is used relatively quickly once it is stored in the lake. This small storage capacity provides some, but not a lot, of discretion around when the Devils Gate station runs, depending on the inflows.

When water is used to generate electricity it passes through a turbine in the Devils Gate Power Station, which then flows downstream to Lake Paloona.

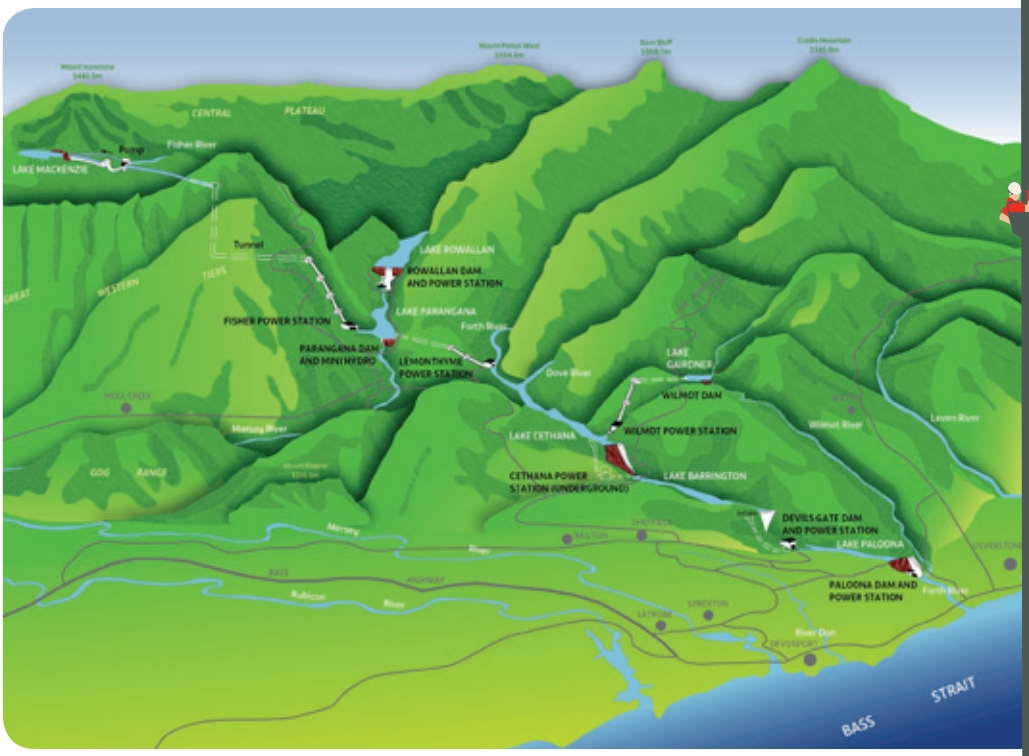
If there were no inflows going into the Lake Barrington it would take about four days running the Devils Gate station at full gate to "empty" the lake. When we say 'empty' it means it would be at the bottom of the hydropower generating range, there would still be water in the lake. This is in contrast to Lake Rowallan (a medium storage) which would take over 50 days or Great Lake (a major storage) at over 700 days to 'empty'.

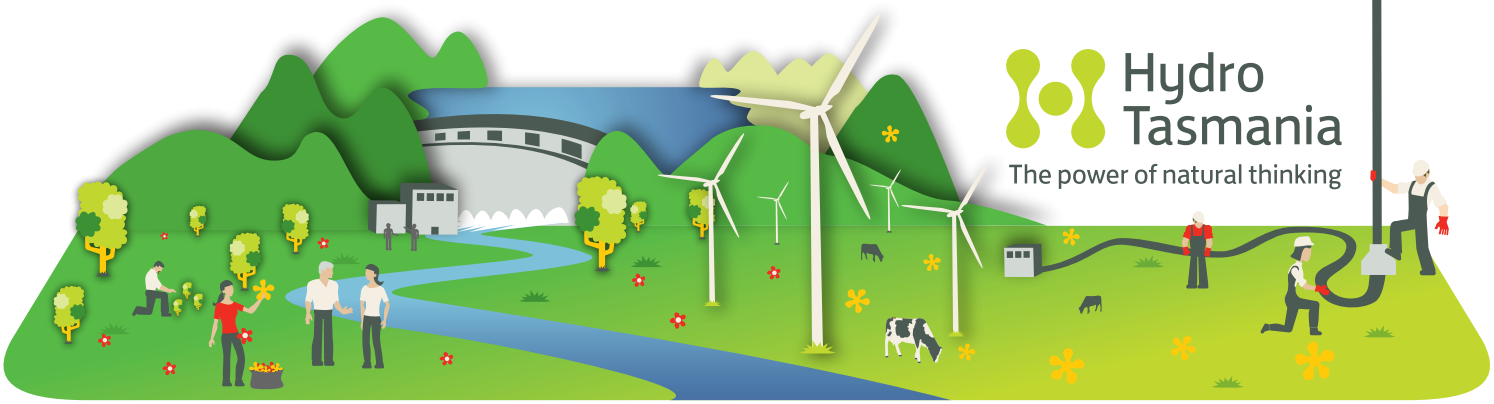
It's a similar story for water going into Lake Barrington: if the Cethana power station, immediately upstream of Lake Barrington, is running at full capacity it would take less than four days to fill Lake Barrington (if the Devils Gate machine, below Lake Barrington, is not running).

So Lake Barrington is not "big" in a hydro generation storage sense but we do attempt to use the storage it has to maximise generation, reduce water spill at the lake and also support recreational users.

Changing lake levels

In general it's better to have Lake Barrington at a high level as this increases the 'head' on the Devils Gate station. Head, is a hydropower term, it is the distance the water falls before turning a turbine to generate electricity. A higher head results in a greater generation outcome. Holding the lake high does, however, increase spill risk (when inflows increase) so there is a trade-off to be made. We tend to maintain Lake Barrington's water levels in a range 1 to 2 metres below full supply level.
Lake Barrington tends to be at lower levels in the wetter autumn, winter and spring months when





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rainfall and inflows are high. In the summer months the level is kept higher because rainfall inflows are low.

Three main things impact on the levels of Lake Barrington:

1. inflows due to rainfall in the catchment;
2. outages at the Devils Gate power station; below Lake Barrington, and in others parts of the Mersey-Forth scheme; and
3. market prices.

1. Inflows

We are able to forecast rainfall and inflows a number of days ahead and based on these forecasts we may 'draw down' some lakes. This means we run the station harder to reduce the volume of water in the lake so that when high inflows arrive we are able to 'catch' as much of the water as possible and use it to make renewable energy. The alternative is risking letting the water spill and lose generation capacity, which is not desirable. When high inflows are expected in the Mersey-Forth chain the lake level at Lake Barrington can be expected to drop in advance of these. That is, when there is water higher up in the 'chain' it will flow down to Barrington, therefore, to catch additional water we need to draw down Lake Barrington.

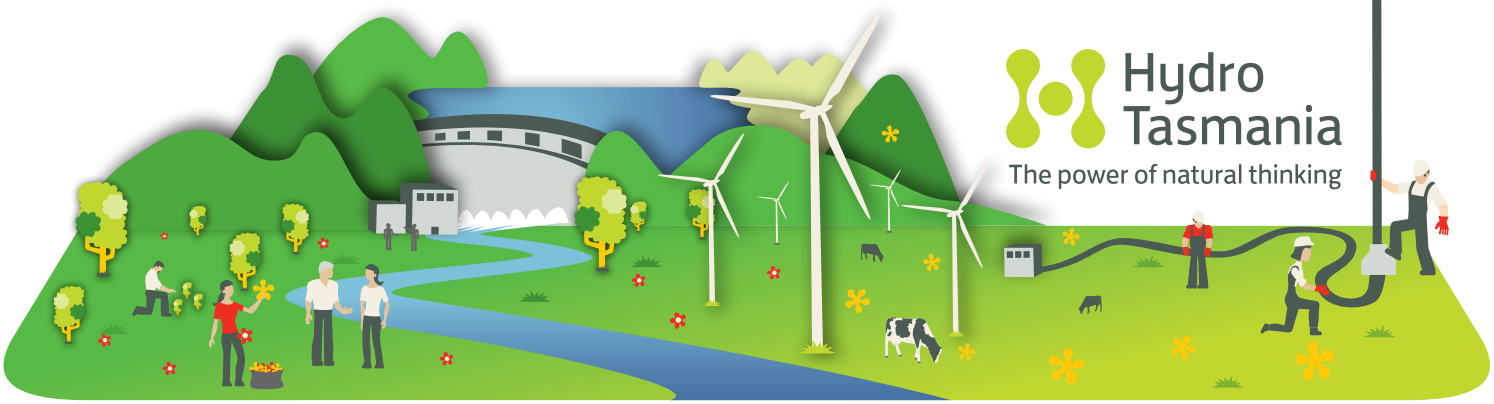
2. Outages

The main cause of significant fluctuations in lake level results from power station outages. This can be on the Devils Gate power station itself, other powers station or infrastructure in the Mersey-Forth scheme, as the water storages are linked.

All our stations are maintained to keep them in good working order, and at times this can involve taking them out of service for weeks or even months. In run-of-river schemes these outages are best timed for the dry months as natural flows in the river are low, so spill will be minimised. To minimise losses further, in the past Lake Barrington has been drawn down to very low levels (5 metres or more below full supply level). This allows us to 'catch' the inflows which occur during the outage as well as keep running upstream stations without causing spill at Lake Barrington. Similarly if there is an outage at an upstream station limiting water flows downstream we will fill the lake close to the top in advance of the outage and then draw it down.

3. Market Prices

We offer our generation into the National Electricity Market (NEM) and stations are dispatched by the Australian Energy Market Operator. If there is if an event in the market such as high temperatures in Victoria driving up demand for electricity or a plant failure that reduces supply, the price of energy can rise quickly from tens of dollars per megawatt hour to thousands. Our hydro stations are able to quickly respond to such events by using water stored in our lakes to maximise the generation. This can at times lead to short term lake level fluctuations.



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