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Thirlmere Lakes Hydrology

Where has all the water gone in Thirlmere Lakes?

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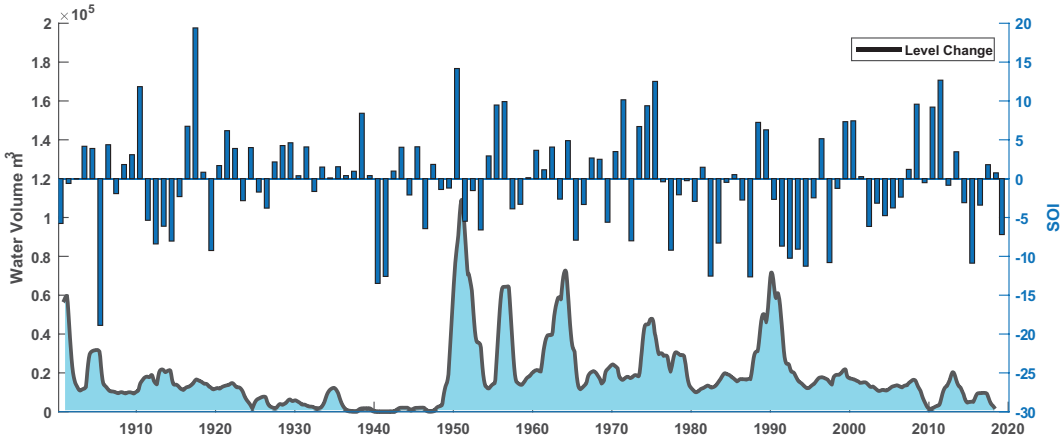
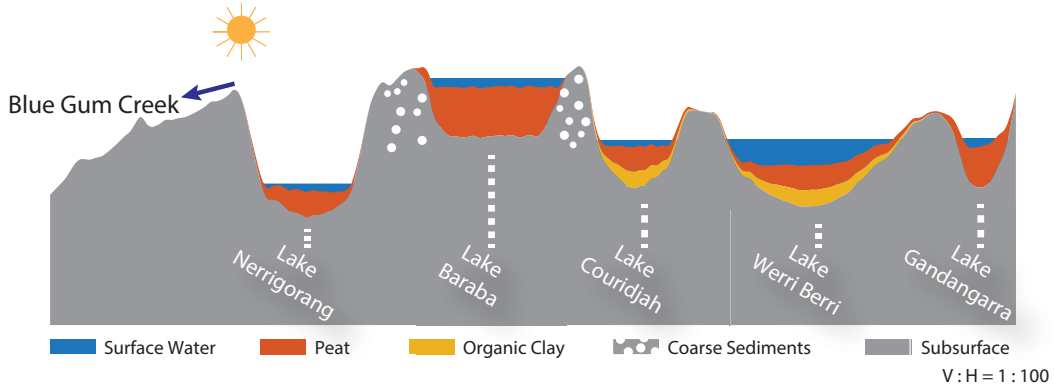
Between 2017 and 2020, researchers at Thirlmere Lakes have been answering the community's question: *"Where has the water gone in Thirlmere Lakes?"*

Here is a summary of what we have learned and what remains a mystery.





For futher information regarding this research, please contact:
Associate Professor William Glamore | w.glamore@wrl.unsw.edu.au

What we know...

Finding 1: The lakes are controlled by the climate

Thirlmere Lakes are sensitive to the climate, especially the rainfall and evaporation. Over the past 4 years, the evaporation has been much greater than the rainfall. When this happens, the lakes lose water slowly and eventually dry out. Current evidence does not show that the lake water levels are influenced by changes in the deep groundwater table (or nearby longwall mines).

Finding 2: The current drought is not unprecedented

The study has found evidence that the water-bodies have previously dried out, including during the World-War-II drought and in other historic periods. In recent times, these dry periods have been short-lived and eventually the lakes rewet.

Finding 3: A vulnerable ecosystem

The water volume in Thirlmere Lakes is reliant on catchment rainfall.

This is because:

- The lakes are at the top of the catchment and have limited inflows from the surrounding catchment;
- The lakes have a small catchment compared to the lake size;
- There is a limited connection to groundwater; and,
- The lakes are shallow, with a low resilience to the drought.

What we still need to determine...

Question 1: What is the process of rewetting after substantial rainfall?

Since 2016 the site has been in an extended drying cycle, influenced by the drought. As such, we do not have sufficient field data to confirm the lake filling-up process and if this rewetting process is similar across the different lakes.

Question 2: What happens if the drought persists for several years?

If the current drought continues, what would the system look like? What is the worse-case scenario? Would the lakes be capable of holding large volumes of water again? How much water is needed to fill the lakes?

Question 3: Is Thirlmere Lakes similar to other spots experiencing drought?

Across NSW, there are many other waterbodies experiencing prolonged drought and fire. Similar systems in NSW include Lake Cathie, Shellharbour, and the upland peat swamps in the Illawarra drinking water catchment. Have these swamps responded similarly or are the driving mechanism different in each location?

Question 4: Will Thirlmere Lakes return to its former glory or has the climate shifted?

Historically, after a prolonged drought, the lakes bounce back when it rains. In the future, we are particularly interested in the influence of climate change on Thirlmere Lakes hydroclimate. For instance, how does the variation of total rainfall, temperature, and seasonality affect the long-term water balance?

UNSW SYDNEY

Water Research Laboratory
School of Civil and Environmental Engineering

Water Research Laboratory
UNSW Sydney
School of Civil & Environmental Engineering
110 King St, Manly Vale, NSW, 2093, Australia
Tel +61 (2) 8071 9800

www.wrl.unsw.edu.au

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