Thirlmere Lakes, in the Greater Blue Mountains World Heritage Area, is a group of waterways that include Lake Gandangarra, Lake Werri Berri, Lake Couridjah, Lake Baraba and Lake Nerrigorang. The lakes are believed to be about 15 million years old.

Water levels in Thirlmere Lakes have fluctuated over time, but the current decline in levels is of significant concern to the local community.

In response to these concerns, in 2011 the NSW Government appointed a group of four independent scientists and a community representative to evaluate possible causes for the low water levels in the lakes.

One of the key issues for evaluation by the inquiry was to examine if the mining activities in nearby Tahmoor were contributing to this decline.

The Independent Thirlmere Lakes Inquiry Committee comprehensively examined all the available scientific information, received and examined public submissions, held two public hearings, commissioned project-specific research, and conducted site visits.

Their findings were also reviewed by the State’s Chief Scientist and Engineer, Professor Mary O’Kane. Both the Committee and the Chief Scientist and Engineer agree that more research needs to be done to fully understand how the lake system works before we can properly understand what is affecting water levels.

Once the definitive causes have been discovered, it will then be possible to determine if any solutions can be employed.
The NSW Government’s response

The NSW Government has considered both the report and review and has already begun implementing the report’s recommendations by:

• providing an initial $200,000 to commence a monitoring program of surface water and rainfall at Thirlmere Lakes

• forming a committee of government scientists from the Office of Environment and Heritage, NSW Office of Water, Sydney Catchment Authority and Chief Scientist and Engineer’s Office to develop and cost a full research program into the causes of changes in water levels in the lakes, based on scientific data and recommendations in the Inquiry Report.

• bringing forward a review of the Plan of Management for Thirlmere Lakes National Park.

Independent Thirlmere Lakes Inquiry Committee

For a list of Committee members and their expertise, see www.environment.nsw.gov.au/water/thirlmerelakesinquiry.htm

What did the Committee find out?

The Independent Committee found that most of the changes in the water levels in Thirlmere Lakes over the past 40 years are due to climatic variations such as droughts and floods.

However, their overall finding was that there is still much unknown about the lakes and their geomorphology and hydrology, and without this information the exact cause of decreasing water levels in Thirlmere Lakes remains a mystery.

While there was no direct evidence that longwall mining is impacting on lake levels, further investigation is required to make a firm conclusion.

The inquiry report shows that there is evidence of groundwater leakage from the lakes towards the east and north-east within the Hawkesbury Sandstone aquifers.

The report demonstrates that, despite the large amount of information compiled, it is not currently possible to disentangle groundwater changes due to mining, from those due to bores, and natural events such as droughts and floods.

No stone unturned…

The study of water loss in such a vast area as Thirlmere Lakes relies on the science of water, or hydrology, along with an understanding of the ongoing processes that shape the earth, or geomorphology.

The Independent Thirlmere Lakes Inquiry Committee examined information on rainfall, lake levels, geology and geomorphology, regional hydrology, groundwater, seismic activity, mining and its relation to groundwater, mine subsidence, bushfires, and European and Traditional Custodian records of the lakes.

The Committee also received information from the community, mining company (Xstrata) and local government, and also undertook its own library and database searches, along with fieldwork and monitoring.
| Committee finding 1. | The lakes have fluctuated between substantially dry and full conditions within European, Traditional Custodian and geological time frames and the present low levels are not unprecedented. |
| Committee finding 2. | The only cause for lake level fluctuations prior to European settlement was climatic (droughts and heavy rains). |
| Committee finding 3. | There is clear evidence from 1974 and 1975 and other times that lake levels declined by more than 2 m in less than one year, and this could only be as a result of evaporation and groundwater drainage as it was prior to coal mining in the area. |
| Committee finding 4. | While changes in rainfall (natural climate change) were undoubtedly responsible for the majority of the change in lake levels in the last 30 years there may be other factors involved in the present low levels. |
| Committee finding 5. | Hydrology models used in the study did not reflect the dynamic and changing nature of the surrounding water catchments, making the findings between rainfall, runoff and lake levels potentially flawed. |
| Committee finding 6. | There is no direct evidence that mining has breached geologic containment structures underneath the lakes, including the Bald Hill Claystone bed. |
| Committee finding 7. | There is substantive evidence of groundwater leakage from the lakes towards the east and east-northeast within the Hawkesbury Sandstone aquifers. |
| Committee finding 8. | There is leakage of groundwater towards the West and down Blue Gum Creek, but it is not possible to determine the relative groundwater flows from the lakes towards the east and west. |
| Committee finding 9. | There is substantive evidence that groundwater levels and the groundwater table has changed over the last 30 years in the regions east of the lakes, which potentially increased the rate of groundwater flow towards the east. |
| Committee finding 10. | There is evidence to suggest that mining has contributed to the changes outlined above in Finding 9, but it is not possible to disentangle groundwater changes due to mining, from those due to private bores, which access the groundwater, natural events such as droughts and floods and possible increased temperatures. |
| Committee finding 11. | There is evidence that the Hawkesbury Sandstone aquifer beneath Lake Nerrigorang has not been depressurised. |
| Committee finding 12. | It is not possible to say whether the impact of mining on groundwater in the Hawkesbury Sandstone is temporary or long-lasting. There is evidence from local private and Xstrata bores of both possibilities. |
| Committee finding 13. | The Plan of Management for the lakes needs to be reviewed and there are gaps in ecological knowledge. |
What did the Committee recommend?
The Independent Committee made 9 recommendations:
- five specific recommendations for more research, including further studies and monitoring
- three recommendations relating to consideration of a ‘groundwater mound’ to minimise groundwater loss
- a recommendation to nominate Thirlmere Lakes National Park under the Ramsar Convention on Wetlands.

What did the Chief Scientist and Engineer find in her review?
The Chief Scientist and Engineer, Professor Mary O’Kane, congratulated the Independent Committee on its contribution to the body of knowledge about the lakes, and on its approach to addressing community concerns.

She said the Inquiry highlighted the complexity of the Lakes catchment and how difficult it is to attribute the fluctuations in water levels that people are witnessing to any one cause.

The Chief Scientist and Engineer’s review confirmed that some findings have a good evidence base, but that others require a greater level of scientific data and analysis to form robust conclusions. She strongly supported the Inquiry Report’s call for further research and monitoring.

How can I read the full final report and recommendations?
The final Thirlmere Lakes Inquiry report and the Chief Scientist and Engineer’s review are available at:
- Chief Scientist and Engineer’s review – www.chiefscientist.nsw.gov.au/reports