

MINE CLOSURE APPROACH UNDERGOES RETHINK

When breach of the dyke that separates Lake Kepwari mine pit void in southwest Australia from the adjoining river occurred, the immediate concern was minimising impacts to downstream recreational and livestock water sources.

However, the incident caused a significant re-evaluation of the closure approach to this mine lake and demonstrated that allowing the Collie River South Branch to flow through the lake would improve river water quality and greatly improve the lake's ecosystem values. This finding was a dramatic turnaround from the former prevailing wisdom that excising the lake from the river was necessary to protect the river.

In the aftermath of the breach, Premier Coal sought an alternative, potentially more sustainable approach to permanent closure of the pit lake, for which the company had been in the final stages of seeking regulatory approval.

Studies were initiated, firstly to investigate and resolve any risk and liability from the failure and secondly, to provide long-term strategic direction. Golder assembled a project team, including research scientists from the Mine Water and Environment Research Centre at Edith Cowan University in Perth. The team put together a high-quality river and pit lake ecological assessment and water quality monitoring program.

Ensuing research indicated that the lake had potential ecological values to positively benefit the region's communities and wildlife. Nutrient concentrations – not the water acidity of the lake – were shown to be the main factors limiting its ecological value.

Allowing river flow-through to continue would not only avoid future dyke failure risk, it would also improve Lake Kepwari quality over the long term and contribute to regional ecosystem values.

The management plan that Golder developed has been used to devise an engineered trial of the flow-through system, which has continued to monitor river flows and lake water quality over these last few years. Sufficient understanding of the new hydrological, limnological, chemical, and ecological interaction between the river and the lake will enable a final sustainable closure plan to be implemented.



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In one of the ongoing studies funded by the Australian coal industry and also directly by Premier Coal, associate professor Mark Lund from Edith Cowan University examines a zooplankton sample from Lake Kepwari. Zooplankton numbers have increased following river flow-through as a result of more nutrients in the lake stimulating aquatic food-chain development.