

Latrobe Valley Regional REHABILITATION STRATEGY

Regional Water Study

REHABILITATING THE LATROBE VALLEY'S COAL MINES

The Latrobe Valley's three brown coal mines—Hazelwood, Yallourn and Loy Yang — have fuelled most of Victoria's electricity generation since 1924. Hazelwood closed in 2017 and Yallourn and Loy Yang are planned to close by 2032 and 2048 respectively. Each of the Latrobe Valley brown coal mine operators are required to develop a plan to rehabilitate the mine sites in order to achieve a safe, stable and sustainable landscape once mining activity ceases.

BACKGROUND

A reopened inquiry into a coal fire that burned for 45 days at Hazelwood in 2014 found that using water to create 'pit lakes' in the areas where coal has been mined was likely to be the most viable way to achieve safe and stable rehabilitation of the mines. However, the Inquiry recognised that significant knowledge gaps existed in relation to the feasibility of this rehabilitation option, and recommended further investigations be carried out.

These investigations — geotechnical, water and land use planning studies — were undertaken as part of the Victorian Government's preparation of the Latrobe Valley Regional Rehabilitation Strategy. The studies, which were carried out by technical specialists from 2017 to 2019, consider the regional benefits and risks associated with stabilising the mine pits (or voids) by creating full or partial pit lakes.

The Strategy provides information on the:

- regional risks that need to be considered and addressed in rehabilitation plans;
- feasibility of using water if required for safe, stable and sustainable rehabilitation; and
- possible future land uses for the rehabilitated sites in a regional context.

The final Strategy was released on 26 June 2020.

LATROBE VALLEY REGIONAL WATER STUDY

The Latrobe Valley Regional Water Study assessed the feasibility of supplying water to rehabilitate the Latrobe Valley's brown coal mines at Hazelwood, Yallourn and Loy Yang once mining has ceased. This included how and if this could be done without affecting water security and access to water for residents, industry, farming, and the environment.

The Regional Water Study improved our understanding of future water availability in the Latrobe River system, potential alternative water sources, water quality and the water needs of the system's rivers and wetlands.

FUTURE WATER AVAILABILITY AND MINE REHABILITATION

Uncertainty in future water availability poses a significant risk to water-based rehabilitation approaches, as water may not be available in the volumes required and at the times needed. Mine rehabilitation must plan for a drying climate and we must consider alternative options that do not rely on water from the Latrobe River system.

The Regional Water Study found that surface water availability in the Latrobe River system has decreased significantly in the past 20 years, from a long-term average of about 800 gigalitres a year to about 600 gigalitres a year since 1997. While there are no indications that this trend will reverse, there are uncertainties associated with future water availability due

to climate change and climate variability. The dry climate scenario assessed in the Regional Water Study found that the mean annual water availability in the Latrobe River is projected to decline to approximately 467 GL a year by 2050 (soon after Loy Yang is set to close), and 334 GL by 2080.

Another finding of the study was that the Latrobe Valley's brown coal mine voids may take decades each to fill using water from the Latrobe River and Latrobe Valley aquifers. Using water to fill the mine voids would need to be restricted or halted under dry conditions to prevent unacceptable impacts on other water users and the environment. The impact of this is that a slowed and extended filling period could also negatively affect the safety and stability of the mine voids during rehabilitation.

POTENTIAL WATER REQUIREMENTS FOR MINE REHABILITATION

Depending on when each mine closes and if each void needs water, up to 2,800 GL could be required, equivalent to six times Melbourne's annual water use. The minimum volume required to achieve weight balance (a major factor for safety and stability) is 1,641 GL.

The estimated ongoing volume of water needed to replace losses from evaporation is dependent on future climate change, though it is estimated to be around 5–7 gigalitres per year for each mine under current conditions. For comparison, in 2017–18 Gippsland Water supplied towns (excluding industry) with 12.8 gigalitres of water.

One of the main purposes of the Regional Water Study was to understand whether the supply of these sorts of volumes of water from surface water and groundwater sources is achievable once water ceases to be used for power generation, considering climate change and the needs of other water users and the environment.

To protect the security of existing entitlements for other water users and prevent further environmental impacts, the maximum annual supply of water for mine rehabilitation would need to be no more than the power stations' current annual net usage. Any filling of the mine voids with water from the Latrobe River system would need to be subject to conditions, such as restricting or halting filling when it is dry, to prevent unacceptable impacts on

other water users and the environment and allow for declines in water availability to be shared between all water users.

ALTERNATIVE WATER

The Latrobe Valley Regional Water Study identified a range of possible alternative water sources and assessed their suitability for mine rehabilitation. It considered the potential volumes that could be supplied from both new and existing alternative water sources, water quality and infrastructure costs, amongst other things.

Recycled water and desalinated water can potentially offer the large volumes needed. Both options would require significant investment due to infrastructure costs, such as building a pipeline to supply a large volume of recycled water to the Latrobe Valley, and ongoing maintenance costs. They would also require appropriate time to plan and build any potential infrastructure. The alternative water would need to be treated to a quality that is suitable for the intended use of the mine waterbody, meet regulatory and environmental standards, and reflect community expectations. Meeting these requirements may involve high treatment costs.

THE IMPACT ON WATER USERS

The Latrobe Valley Regional Water Study found that there is significant uncertainty about whether water required for water-based mine rehabilitation approaches would be available from the Latrobe River system under a median or dry climate change scenario. This is because its impact on existing water users would be unacceptable. These users include:

- Farmers and irrigators (food and livestock)
- Urban users (households and small businesses)
- Industry (mining, power generation and other local Industry)
- The environment

The Latrobe River system and fringing wetlands rely on environmental water entitlements on top of natural flows, to help provide sustainable habitats for many threatened and endangered species. These species and the wider health of the system could be threatened by further loss of flows from the Latrobe River.

OTHER STUDY FINDINGS

- The quality of water in the mine void would be influenced mainly by the water sources used to fill them. Acceptable water quality standards are therefore expected to be achievable by the mine operators, and any discharge would be regulated by the Environment Protection Authority Victoria.
- Groundwater pumping at the mine sites is needed to maintain stability and will need to be continued by the mine operators until a stable landform is achieved.

CONTACT US

For more information visit www.water.vic.gov.au/planning/LVRRS/ or contact the Latrobe Valley Regional Rehabilitation Strategy Project Team on **(03) 5184 2000** or via email at lvrrs@ecodev.vic.gov.au