

Current Research on Mine Water and the Environment in New Zealand

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Modern mining increasingly requires social licence to undertake all activities, from exploration through final closure. While this social licence has strong cultural, political, and economic aspects, it needs to be underpinned by scientific knowledge of its potential environmental effects, and technological approaches that can be used to resolve environmental issues. Water quality is one of the major aspects associated with obtaining social licence to mine, and the effects of that water quality on biota is a topic of growing concern with the public. In this Special Issue, we have gathered some representative papers from a 10-year multidisciplinary research programme in New Zealand aimed at understanding and mitigating mine water quality issues. The relationships between water quality and New Zealand's unique endemic biota have been a particular focus in this research programme, but the principles behind these studies are applicable world-wide.

The New Zealand mining sector occurs within a relatively young and active geological setting that gives rise to

many different mineral deposit types as well as a rich mining history. The New Zealand climate is highly varied, ranging from sub-tropical through cool temperate to arid, with some mines receiving up to 6 m of rain a year, while others experience annual evaporation that exceeds precipitation. Currently, mining in New Zealand mostly focuses on alluvial, epithermal, and orogenic gold deposits; lignite, sub-bituminous, and bituminous coal deposits, and Fe-rich mineral sand. In addition, exploration and resource development programmes are underway for other types of mineral deposits. Authors have contributed research papers to this Special Issue based both on water quality datasets from active mine sites and longer term water quality issues at abandoned historic mine sites. In this Special Issue, we present mine water research with several themes:

- Geochemical studies to identify factors that control mine water chemistry
- Innovations in passive mine water treatment
- Effects of mine waters on downstream aquatic ecosystems
- Interactions between mine waters and terrestrial plants after mine closure

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