**Transforming Mine Closure with GIS and Climate Data for Nature-Positive Outcomes**

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# ABSTRACT

The mining sector stands at a pivotal moment for climate- and nature-positive innovation. With Australia’s legislative and policy framework evolving to align with global climate and sustainability goals, the industry faces unprecedented pressure to achieve measurable emissions reductions and deliver nature-positive outcomes. Despite this, the integration of Geographic Information Systems (GIS) with climate data to inform mine closure planning remains an underutilised approach.

This paper highlights the innovative potential of EcoScenario, a spatial and climate data science tool, to bridge the gap between climate science and actionable decision-making in mine closure and post-mining land-use planning. Using a hypothetical example, this paper demonstrates how EcoScenario enables mining companies to model site-specific climate risks—such as bushfires, flooding, and extreme weather—using globally recognised scenarios developed by the Intergovernmental Panel on Climate Change (IPCC). Incorporating these scenarios ensures scientifically robust and comparable outputs across sites, companies, and reporting periods, enhancing decision-making credibility while supporting compliance with the Australian Sustainability Reporting Standards.

By combining spatial analysis with climate science, EcoScenario facilitates the creation of resilient rehabilitation plans and optimised land-use strategies. This innovative approach empowers mining companies to make informed decisions, mitigate liabilities, attract investment, and manage long-term climate risks, while contributing to broader environmental and societal goals. EcoScenario positions mining operations as leaders in sustainable resource management and climate adaptation, equipping them to address present and future challenges in a rapidly changing world.