ACARP matters because it

addresses mine subsidence impacts

Subsidence is a key issue facing Australian underground coal mines. As a consequence of coal extraction using the longwall method, the surface subsides. The prediction and management of impacts on constructed features is simplified by the fact that they have known engineering properties and limits. Natural features such as rivers and cliffs are heterogeneous in nature and can react differently to subsidence. The thickness, strength, stiffness, in-situ stress and existing flaws within each rock unit vary from site to site and within each site, making specific predictions of impact subject to more uncertainty when compared with built features. Research is being undertaken by the industry to develop tools to improve the prediction, control, mitigation and measurement of mine subsidence impacts.

Industry target

- Better understanding of mine subsidence impacts on natural features, the built environment, major infrastructure and agricultural land
- Development of guidelines for minimising impacts to natural features
- Better understanding of mine subsidence impacts on water and eco-systems
- Development of tools to predict mine subsidence impacts
- Development of tools to measure and monitor mine subsidence impacts
- Development of mine subsidence mitigation techniques.

Industry investment

- ACARP: $5.4 million, plus industry funding
- Around 28 projects over 21 years.

Results

- Development of a subsidence, upsidence and closure model which allows prediction of subsidence movements around valleys and slopes
- Development of management guidelines for mining under or close to cliffs, gorges and river systems
- Understanding of the effects of mine subsidence on the productivity of cropping and grazing land
- Development of mine subsidence impact assessment and monitoring techniques, including space geodetic techniques; the use of geographic information systems and high-resolution, remotely-sensed data; ground and surface water monitoring and modelling; and new and improved monitoring methods for flora and fauna
- Development of control/mitigation techniques such as design of mining setback distances for features that cannot be mined under, subsidence reduction techniques, grout injection, and expansion slots to redirect movements away from sensitive features
- Improved understanding of the potential impacts of subsidence on houses
- Improvements in predicting and modelling subsidence movements has allowed mining companies to determine the most appropriate technique to reduce impacts associated with subsidence movements based on monitoring data from previous mining areas.

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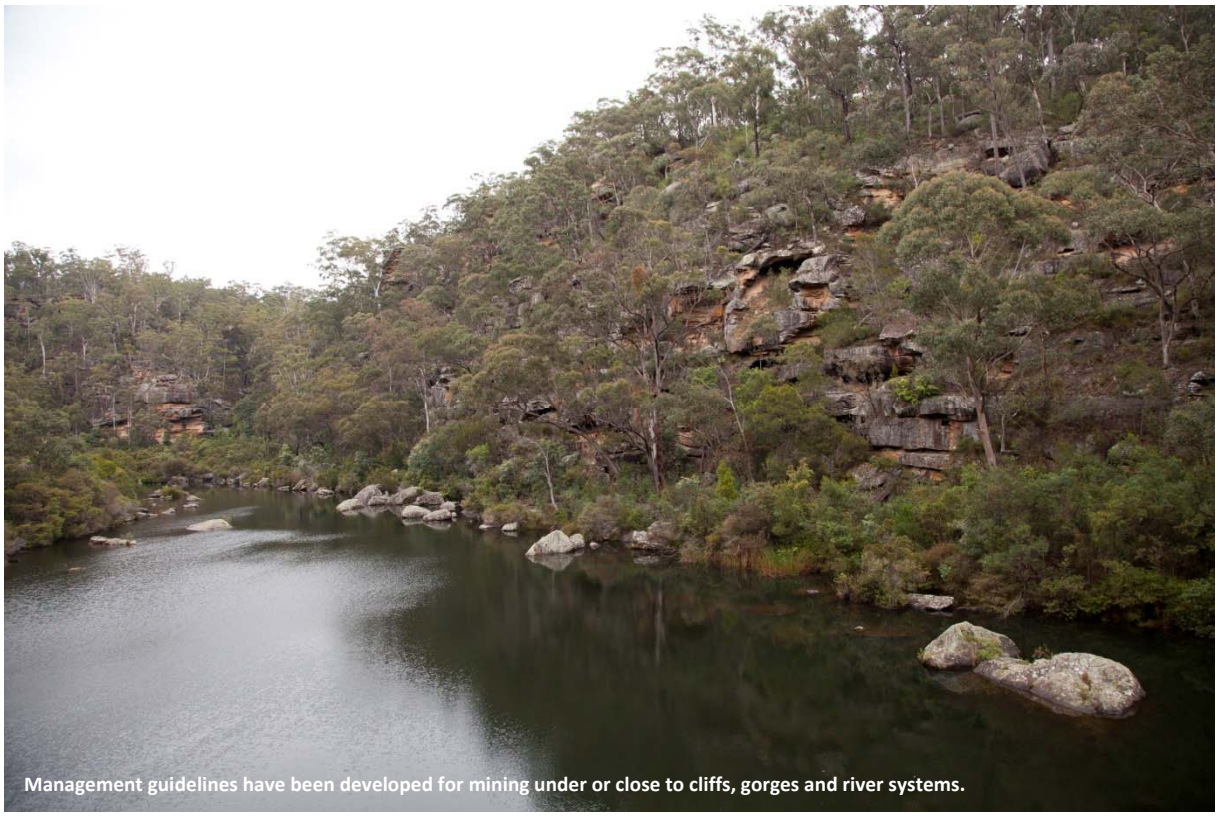

Management guidelines have been developed for mining under or close to cliffs, gorges and river systems.

Return on investment

ACARP research into subsidence significantly contributes to the sustainability of the underground mining industry through:

- Reduction in unpredicted mine subsidence impacts
- Reduction in mine subsidence impacts that cannot be effectively mitigated
- Lower mine subsidence mitigation costs
- Minimising the amount of coal resources sterilised by not be able to mine under sensitive features
- Greater certainty for stakeholders and government which facilitates mining approvals
- Responding to stakeholder requests for the industry to reduce impacts relating to mine subsidence.