

Managing the interrelationship between mining and maintaining natural systems requires a delicate balance and a combination of river engineering, geomorphology, science, and great communication skills.

Constrained by Walker and Carborough Creek systems in the Bowen Basin, BHPBilliton engaged Alluvium to initially undertake a conceptual and functional design (2013-16) and most recently the detailed design to divert a 8.5 km reach of Walker Creek to allow for access to new underground coal reserves.

During the detailed design phase, the team developed a design that would allow the diversion to achieve adequate stream parameters while utilising existing terrain features to reduce the overall excavation needs and hence cost to the client.

Alluvium has been working in the management of river diversions for almost two decades and understanding sediment generation and transport issues is key to successful outcomes. The images below show the dramatic results that can be achieved when diversions are done correctly



Before (1999)



After (2014)

ACARP

Our work undertaken at the Walker Creek and around the Bowen Basin more generally is underpinned by our involvement in over a decade of research with the Australian Coal Association Research Program.

In 2002 we began our first work with ACARP and carried out a review of Australian and global best practice diversion design and lead an engagement process with State regulators to gain support for the adoption of a new design methodology.

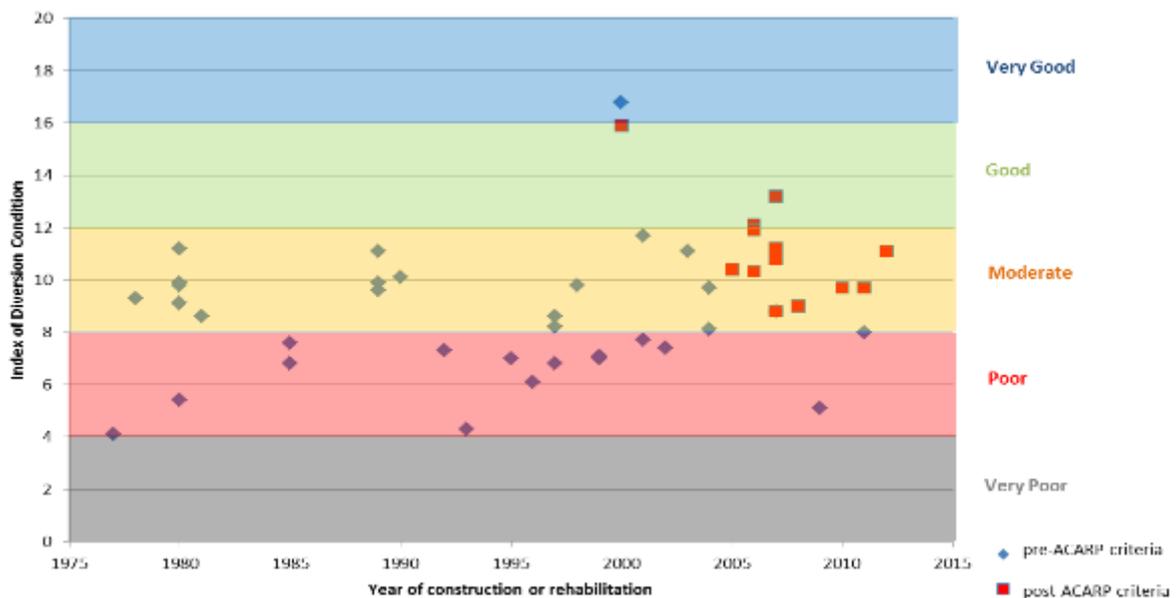
The need for this project arose from a deficiency in quantitative guidelines for diversion design and rehabilitation of waterways in the Bowen Basin. An understanding of the key features of, and processes occurring in, rivers and diversions highlighted the need for targeted research to quantify the key parameters that affect and dictate the shape and form river.

The data collected was compiled to identify the occurrence and range of three parameters; the velocities, shear stress and stream powers, in natural rivers and streams throughout the region. The information was used to develop an understanding of the link between these hydrologic and hydraulic parameters and the shape, size and occurrence of geomorphic units within the stream systems. These parameters formed the basis of criteria that can be applied to the design and rehabilitation of diversions in the semi-arid region of the Bowen Basin.

The design criteria has since been adopted by the Queensland Department of Environment and Natural Resources and have been applied to other river systems in Australia.

12 years on

Over a decade later we revisited this work to review the condition of waterway divisions after the implementation of our 2002 work.



This study revealed that all diversions built following the 2002 work were classified as being in moderate or good condition.

Relinquishment of mine site stream diversions

More recently we were funded to develop and trial a process for relinquishment of mine site stream diversions as part of the mine closure process.

The objective of this project is to establish the criteria for functioning river landscape units in mining and post mining landscapes in the Bowen Basin, Queensland.. This recently completed work will become highly influential in guiding future river diversion design and monitoring.