

# ACARP Matters



## **The verdict is in: Hunter Valley mine rehab can sustain active grazing**

**Quantitative data from a three and a half year, independent research project has shown that rehabilitated mined land in the Upper Hunter Valley can produce forage feed capable of sustaining healthy cattle, making the land suitable for grazing livestock.**

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Prior to the research, the grazing capacity of rehabilitated mine pastures was not fully known and, in many cases, the grazing benefits had not been fully documented. The Upper Hunter Mining Dialogue (UHMD) – a coalition of coal mining, agriculture, community and environmental groups, and local and state government representatives – had questions about the productivity and sustainability of mine pastures, and associated livestock production. There was also uncertainty around the potential for heavy metal residues to

contaminate soil, pasture and livestock.

This research project, initiated and supported by the UHMD, was undertaken by a team from the New South Wales Department of Primary Industries (DPI) to address the information gaps. Funding was provided by ACARP and the New South Wales Division of Resources and Energy, with in-kind support from the DPI.



Members of the advisory panel inspect the Angus cattle grazing on mine pasture.

Photo courtesy of Bob Mackie, theresource.

Research was conducted at two sites – one near Singleton (Coal & Allied’s Hunter Valley Operations, now jointly owned by Yancoal and Glencore) and one in Muswellbrook (BHP’s Mt Arthur Coal). At each location, rehabilitated mine pasture paddocks were compared against adjacent analogue native pasture paddocks. The Singleton site comprised two 20 hectare paddocks for each, rehabilitated to pasture in the 1980s. The Muswellbrook site comprised three 10 hectare paddocks each, rehabilitated to pasture in the late 1990s. These well-established sites were selected to ensure that the rehabilitation had had a chance to settle in.

An advisory panel of graziers (who supplied cattle for the research) and UHMD members was formed to provide guidance to the research team. In order to establish baseline data, the advisory panel and researchers decided that the project design should be as simple as possible. Grazing management was based on a simple rotation, with cattle moved to a new paddock every three months after weighing. The stock comprised Angus steers rather than breeding cows. No fertilisers, supplementary feeding or minerals were used.

Project lead, Neil Griffiths, said the research results were positive.

“The results showed that you can get very good performance out of rehabilitated grazing country when it’s managed appropriately. With a little bit of effort and minimal cost, these areas can be quite productive and, potentially, more productive than they were in the past, which is good news,” he said.

“I think what this research has shown is that you can get good results from existing practice. What we’re now looking at is how we can get better results, what we can tweak in future to get even better results from that grazing perspective. This includes addressing soil fertility and using better quality and potentially more productive Rhodes grass varieties. The old Pioneer is basically a ground stabiliser used for earthworks. It’s not a variety that we’d be planting for grazing.

“The challenge for the mining industry now is that it’s shown it can produce good rehabilitation; so there’s an expectation that it will continue to do so.”

Research results showed that the mine pastures performed well in terms of cattle and feed quality, pasture diversity and toxicity levels. Steers grazing on the rehabilitated mine pastures were found to have gained more weight, have better condition (fat cover) and be worth more money than steers grazing on the analogue native pastures. Forage feed value reflected growing conditions, plant species and plant growth. The high species diversity in the rehabilitated pasture showed that many grass and herb species (mainly natives) had spread into these areas after sowing with introduced species. Although the sown grasses (Rhodes grass, panic grass, kikuyu grass) and legumes dominated this pasture, other species were present and could increase if growing conditions changed to favour their growth. In addition, plant analysis revealed no heavy metal toxicities in pasture samples.

Bill Baxter, ACARP Industry Monitor and Yancoal environmental specialist (rehabilitation), said this research confirmed that the landforms the industry was constructing as part of its rehabilitation programs were suitable for grazing. However, he said he was surprised by the extent to which the mine pastures had outperformed the analogue sites.

“I just didn’t think there would be that level of difference – the contrast between the two was quite marked, not in all seasons but, definitely, in the first round of cattle that we put through,” he said.

“The other thing that I found useful was learning how to manage the rehab in the early stages. When mines put areas to grazing, they sow quite a diverse pasture mix, which provides good feed quality throughout the year. However, some of the summer pastures need to be grazed to

keep them in check, so we probably need to get them into grazing earlier just to maintain the quality of those pastures over time. There's a lot of value in more actively grazing these areas and having a real focus on pasture improvement.”

Neil said not only was the research a valuable resource for the mining industry, it had application for the grazing industries as well.

“Getting a good result with pasture rehabilitation, and using the sort of practices that are well established and well known within the grazing industries, benefits both industries. At the end of the day, we're hopefully going to have areas that are returned, possibly, to improved productivity from the grazing industry perspective. So there is a common interest in getting that good result,” he said.

Neil and his team have received ACARP funding for a follow-on project to review rehabilitation practices and results at other Hunter Valley operations and to determine whether the rehabilitation at Hunter Valley Operations and Mt Arthur Coal is representative of mine rehabilitation across the region. He said, however, that the seasonal (drought) conditions were making the project challenging.



Cattle grazing trial.  
Photo courtesy NSW DPI.



Angus cattle grazing on the Hunter Valley Operations rehabilitation paddock in 2016.  
Photo courtesy of Bill Baxter, Yancoal.

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**For further information:**

The final report is available from the ACARP website. Report number C23053

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