ACARP Project C25032

Report 5

Using workshop processes to generate stakeholder agreement about transferring post-mine land to grazing in central Queensland

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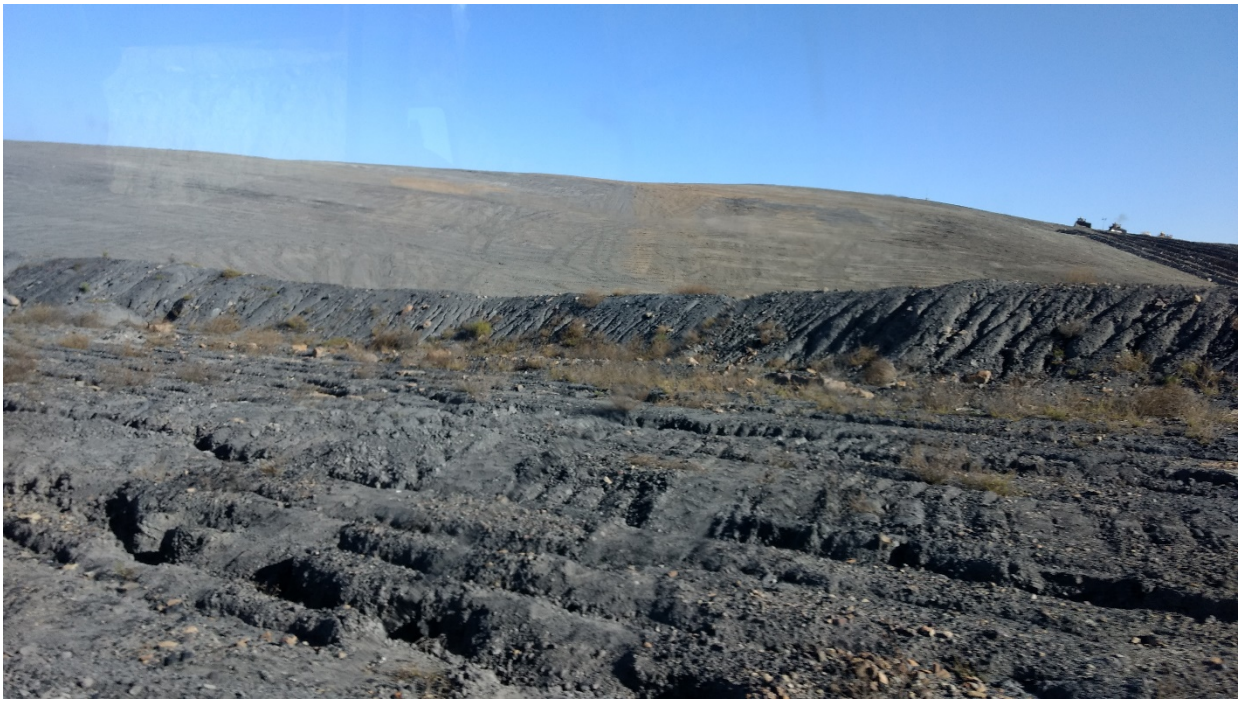

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Research Ethics

This study was approved by the CQUniversity Human Research Ethics Committee (Approval H16/11-305) according to the National Statement on Ethical Conduct in Human Research.

Abbreviations

ACARP	Australian Coal Association Research Program
DEHP	(Queensland) Department of Environment and Heritage Protection
DES	(Queensland) Department of Environment and Science
DRNM	(Queensland) Department of Natural Resources and Mines
EA	Environmental Authority
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
NRM	Natural resource management
PAC	Participatory Advisory Committee
QG	Queensland Government

Contents

Abstract

This report examines the factors influencing integration of post-mining lands into pastoral properties in the Bowen Basin in Australia, and explores a stakeholder workshop process for gaining consensus about priority issues and acceptable solutions in a hypothetical mine closure scenario. Stakeholder planning workshops about post-mining land use with a mock-up case study mine are described in this report. The research shows that group processes and engagement among diverse stakeholders can lead to broad agreement about factors relevant to land use decisions and about options for future land uses at a case study/ individual site level.

1. Introduction

Mining operations in Queensland are required to undertake rehabilitation to a standard that satisfies government regulators before a mining lease and associated responsibilities can be relinquished. However, to date, neither the regulator nor the mining industry have established effective or standardised processes to engage the local and/or regional landholders in making decisions about post-mining land use and reaching agreement about post-mining land uses. This report examines the factors influencing the integration of post-mining lands into pastoral properties in the Bowen Basin in Australia, and explores a process for gaining consensus about priority issues and acceptable solutions in a hypothetical mine closure scenario. This offers useful insight into the approach that may be used by companies and Queensland regulators to engage stakeholders around the land-use goals of rehabilitation and conversion to post-mining sustainable land uses. The report is structured as follows. Section 2 discusses existing research literature relating to landholders and their willingness to incorporate land into a grazing enterprise including factors influencing their decisions and practices. Section 3 describes the methodology adopted for this study. Finally this report discusses the key findings from the landholders' workshops, and then provides some strategic guidelines on how the landholders can be involved with the management of ex-mine land.

2. Engaging Landholders in Decision about Use of Ex-mine Land: Factors and Practices

2.1 Importance of engaging landholders in post mining land use decisions

Worrall, Neil, Brereton and Mulligan (2009) argue the value of local stakeholders participating in decisions about management of post-mining lands. Others, too have advocated involving local stakeholders in planning and management of post-mining land uses since, "*A pre-condition of this adaptive management approach is that all stakeholders (operator, regulator and community) are involved in setting and accepting the parameters for decision-making*" (Doley & Audet, 2013, p. 2). A similar argument posits socio-economic concerns (rather than scientific one) as the basis of all rehabilitation projects (Collier, 2011) making stakeholder engagement in planning and monitoring of rehabilitated landscape a basis for participatory, collaborative efforts that can glean information about diverse values (Collier, 2011). This is consistent with the general literature about agricultural innovation, sustainable farming systems and responsible land use management which all designates the role of the landholder as crucial to successful farm management (Grigg et al., 2006; Milestad et al., 2012). Landholder participation from the outset is also standard practice in agricultural extension and multidisciplinary farm management (Norman, 2002; Petheram & Clark, 1998).

With respect to land use in regional Australia, landholders are a key stakeholder group. Stakeholders relevant to post-mining land use change in the Bowen Basin are mining-affected people with considerable knowledge about some aspects of Central Queensland land uses and economy; with strong connections to one or more identified stakeholder groups (e.g. local landholder, traditional owner, natural resource manager; local council or local environment groups); and with motivation and availability for engagement activities proposed. Stakeholder engagement will encompass various people deemed to have an interest in the issues, (because of their legitimacy or stake in the outcome); influence (because of their power or ability to affect the outcome) and/or an imperative (in terms of needing the matter to be given immediate attention) (Mitchell et al., 1997; Reed et al., 2009).. Foremost among them are those directly affected especially those who have a stake in the land on which the mine is operating or adjoining properties. Others who are directly affected are local and state governments, mining company and contractors' employees, suppliers, businesses and civil society groups in proximate communities, and others with local interests. This particularly relates to inclusive processes encompassing the different perspectives of miners, regulators and graziers about the priorities for land management. The potential benefits of involving landholders as primary stakeholders relate to tailoring practices to local conditions and also to problem identification, harnessing of local technical knowledge and development of a sense of 'ownership' from the experiential process itself (Vanclay & Lawrence, 1995). Landholder participation in the formative stages and in the evaluation of outcomes enables proposed land uses, farm management practices and farming systems to be judged and defended on multiple criteria (Chataway, 2006; Norman, 2002). That is, involving stakeholders provides the opportunity to evaluate options for land uses and management strategies as to how they avoid known rehabilitation risks while satisfying multiple criteria of graziers.

2.2 Factors affecting landholders' decisions about utilising ex-mine land

Generally, farmers make their land use, business and extension decision based on their private production benefits (Morgan, Hine, Bhullar, & Loi., 2015; Page & Bellotti, 2015) or personal identity or lifestyle benefits (Burton, 2004) or location and social cohesion (Morgan et al., , 2015). The question is whether graziers perceive these (or other) potential benefits as associated with rehabilitated mining leases and whether that would motivate them to lease or buy areas that were previously mining tenements.

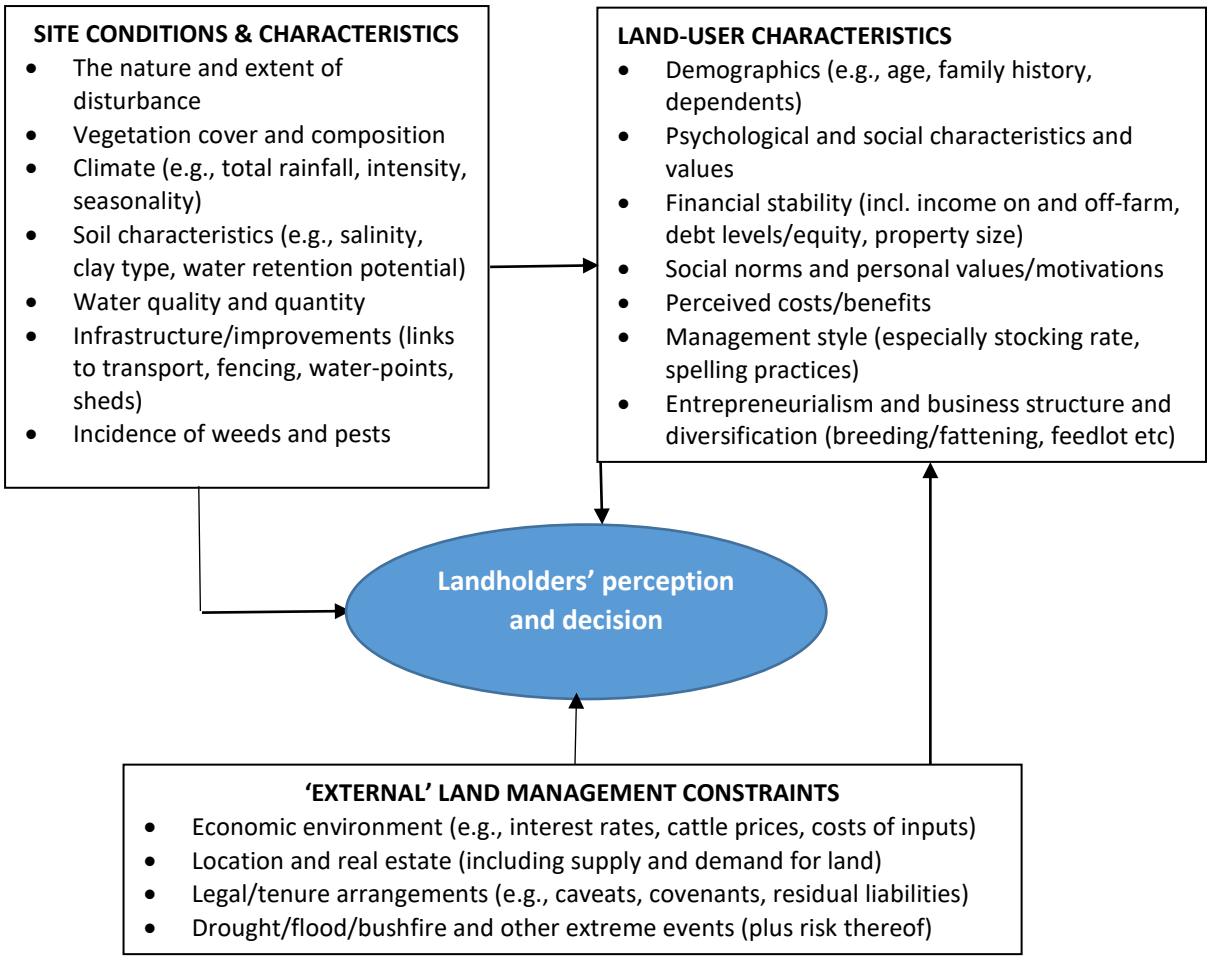
Extrapolating from studies such as those outlined above, we can infer that many personal, social, cultural and economic factors could motivate graziers to take on a relinquished lease or militate against it. It is also evident that the various intrinsic and extrinsic factors that motivate pastoralists range from financial to non-financial, material to non-material, environmental and ecological to political and administrative, and short to long term factors. Some relate to the specific nature of the management practice to be adopted (in this case assuming stewardship of mined land). However, more general understandings of graziers' land management practices and the factors that inform their decisions on desirable properties and land management strategies gives insight into their likely interest in and relationship with rehabilitated land.

An investigation by Maczkowiack et al. (2009) explored the management style likely to be used by Central Queensland graziers, if they were granted tenure of mined land. The chief influences on graziers' management style were found to be:

- the financial stability of the grazier's business (25%);
- the effect of interventions that a company may take; for example, building respectful, trusting relationships with graziers (23%);
- graziers' non-financial motives in seeking tenure of mined land (17%);
- graziers' underlying rural values and attitudes to land management (14%);
- the property's operational flexibility (12%); and
- the external climatic and economic environment (9%) (Maczkowiack et al., 2009, p. 345)

Earlier research has also illustrated that land managers' personal values are important in influencing the relative weight given to different environmental, economic and lifestyle considerations (Maybery, Crase, & Gullifer, 2005). For example, Bohnet et al. (2011) identified a typology of graziers based on combinations of these factors consisting of three broad types of graziers: (1) traditionalists, (2) diversifiers, and (3) innovators and asserted that "*understanding graziers' values and motivations underlying each of the grazier types*" is essential to optimal land management and environmental outcomes (Bohnet et al., 2011, p. 629). Given this range of perspectives, seeking opinions from any landholder group can result in complex differentiation of land-uses and landscapes, in terms of notions of "*using land to its full potential*" (Burton, 2004, p. 198). To address this complexity and the trade-offs between socio-economic and ecological systems inherent in land use change, some studies have analysed land-holder decision processes with a view to developing frameworks or models of relevant factors in the relationship between landholders and the land (Bohnet et al., 2011; Farmar-Bowers & Lane, 2006;; Plummer & Armitage, 2007; Su et al., 2005). Broadly, key factors can be organised into three groupings: site conditions and characteristics, land-user characteristics, and external land management constraints (Figure 1). The work of Bohnet et al. (2011) highlighted that interactions between these three sets of factors will determine how risks may be minimised, and oppportunities may be maximised.

Figure 1: Factors influencing landholders' decisions about managing mined land



Source: Based on Bohnet et al., 2011; Farmar-Bowers & Lane, 2006; Plummer & Armitage, 2007; Su et al., 2005

2.3 Methods and processes of landholder engagement

Despite the acknowledged value of including landholders in post-mine land futures, few studies of mine closure planning and post mining land use have explicitly considered how to conduct this engagement. Whilst many models of engagement have been put forward, there have been few assessments made with regard to factors of success, and what an optimal model may be. Hence, there is an information gap about who to engage with, in what capacity and when. To date, the widespread endorsement of participatory approaches and stakeholder engagement in closure planning has not resulted in a consensus about effective ways of achieving genuine engagement. Variations in who is involved, how many participants, the value of using concrete versus hypothetical examples, and other issues characterise the many strategies that have been adopted most of which warrant consideration under particular circumstances. These approaches include citizen's juries, reference panels, stakeholder advisory groups, focus groups, field days, surveys, action research and participatory monitoring (Carson & Gelber, 2001; Harding & Macdonald, 2001; Solomon, 1999).

Fundamental to a number of these techniques, including reference groups, participatory advisory committees and stakeholder panels, is group deliberation about shared information and a range of viewpoints. This may be appropriate for decisions with wider public good implications and also to "*induce participants to assume a longer-term and more socially-oriented position*" (Bunse, Rendon, & Luque, 2015, p. 90). Group situations also offer an opportunity for graziers to learn from one another and provide the basis for understanding landscape-scale effects and intersections with policy decisions by considering the perceptions of groups of landholders in aggregate.

Use of a Participatory Advisory Committee (PAC) has been advocated as a strategy for managing shared land, since it provides a forum for managing risk and supporting stakeholder analysis as a basis of adaptive management in dynamic and uncertain situations (Leys & Vanclay, 2011). Post-mining land use decisions do have an element of uncertainty, particularly around residual risks associated with mined land; hence a PAC may help to provide new knowledge to supplement existing decision-making. Involving landholders as key players in such a committee facilitates learning from a combination of different types of knowledge, including both experiential and experimental knowledge (Milestad et al, 2012).

Stakeholder panels have also been studied for their role in undertaking assessments, guiding decisions (Glass et al., 2013) and in specifically evaluating rehabilitation (Minserve Group, 2007; Owen & Middlin, 2010). The latter studies used visual indicators and showed that stakeholders can play an important role in establishing stakeholder acceptance of rehabilitated land; thus contributing to formal sign-off on rehabilitation activities and decisions about land use. Some of the principles of research focus groups used to understand farmers' decisions on land uses apply to participatory advisory committees and stakeholder panels (Blacket & Hamilton, 1992). This can be illustrated by an analogy between the goals and outcomes of research focus group discussions, and those of post-mine decision-making:

> "*Focus groups allow respondents to react to and build on the responses of other group members. This synergistic effect of the group setting may result in the production of data or ideas that might not have been uncovered in individual interviews. Differences of opinion among group members also help researchers identify how and why individuals embrace or reject particular ideas, communications, or products*" (Stewart et al., 2007, p. 43).

Furthermore, membership of such deliberative groups typically needs to be limited to a number permitting genuine discussion – often regarded as about eight to twelve persons (Stewart, Shamdasani, & Rook, 2007). Group settings stimulate greater reflexivity and allow participants to explain and qualify their responses or

identify significant contingencies associated with their answers – important elements of exploring hypothetical scenarios.

Limpitlaw et al. (2012) suggested that landholders should be invoved in the design of medium to long term plans for closure and post mining landuse and in monitoring the post-mining landuse. In a South African case, farmers overgrazed the post-mining land because they did not know that the rehabilated land would not have the same capability as their non-mining or undisturbed land (Limpitlaw et al., 2005). This illustrates the value of involving landholders and also the other local and regional stakeholders and experts in the post-mining monitoring stage. Having local graziers manage areas rehabilitated to pasture has further benefits to rehabilitation outcomes like minimising the risk of grazing to the land and enhancing the success of the rehabilitation (Maczkowiack et al., 2012; Melland et al., 2014). A related insight from the research in this field is that "*early and meaningful engagement with graziers in the mined land rehabilitation planning process*" are as important to satisfactory outcomes as any technical solutions (Maczkowiack et al., 2012, p. 87). This is partly because landholders will ensure rehabilitation planning considers the economic and other factors relevant to subsequent grazing enterprises. As Leidtke and Hutchinson (2003, p. 617) argue, "*An economic evaluation of a premining ranching operation compared to a reclaimed area ranching operation shows that a postmining rancher can make a living, providing all of the necessary postmining features are included in the design*". This proviso points to the importance of identifying a range of relevant considerations; prominent among them are grazier's perceptions and practices. Therefore a number techniques and processes including reference groups, participatory advisory committees and stakeholder panels have been suggested by the above mentioned studies but not much work has been done on how well of they work. This study tests stakeholder panel model by using hypothetical post-mine land use exercises. Methods and findings are reported below.

3. Workshop Methodology

Considering the methods, processes and practices of engaging landholders in decisions about post-mine land use that have been described in the literature, this study adopted a qualitative methodology. Specifically, a series of workshops was conducted, in which variations of a hypothetical post-mine land use exercise were posed to participants, to provide a focal point for discussion via open-ended questions. In this way, the workshops assessed individual landholder's perceptions, experiences and local knowledge about neighbourhood and site level issues about mine closure and ex-mine land use. In addition the workshop elicited individual landholder's perceptions of what land use they would envisage and why though the hypothetical mine completion exercise.

The two main workshops were conducted in April and June 2017 in Blackwater, a central location in the Bowen Basin region (Table 1). A previous workshop, held earlier in the year, set the context for the study and focussed on broader regional issues and parameters of post mining land use planning. Some landholders who participated in the April/June workshops also attended this introductory session. A followup workshop was then conducted in September 2017, drawing on the same participants, to confirm a consolidated plan for post-mining land use in the mock case study, as well as to explore other issues relevant to the project and engagement of stakeholders in such decisions.

The essential features of the deliberative workshop process implemented were:

(a) Inviting participation by a representative group of stakeholders;

(b) Utilising a hypothetical case illustrated with visual images as a stimulus or 'boundary object'[1], identify relevant issues and extra information needed;
(c) Facilitating an open discussion of the hypothetical case by diverse interests;
(d) Harnessing expert information;
(e) Encouraging participants to draw on their varied expertise to consider both risks and opportunities in discussions; and
(f) Consolidating the views and seeking group agreement to a broadly acceptable 'solution';

Through this process, the researchers observed the extent of similarity in solutions achieved through deliberation.

The key questions posed included:

- what might be an effective way to use this post-mine land package?
- what would be the key issues and any concerns for you, if you were the land manager?
- what would be achievable in terms of productivity from the land package?
- what risks and opportunities do you envisage in taking on the land package?
- how would you choose to manage this property and integrate it into a grazing enterprise?

Table 1: Post-mining land use Workshops' participants, focus and methods

	Participants	**Focus**	**Methods**	**Expert Input**
Landholder Workshop 1 • 27th April 2017 • Total attendees = 17 (including 4 researchers)	Individual model (mostly neighbouring landholders)	Site issues to convert back to ag. use, individual responses with 'mock mine map'	Individual exercise on planning for mockup case study and open forum, with issues emerging from discussion	Participants, including ACARP Monitor
Landholder Workshop 2 • 1st June 2017 • Total attendees = 25 (including 4 researchers)	Both landholders and sectoral representatives invited	Site issues to convert back to ag. use, group responses with 'mock mine map'	Expert information, and group exercise on planning for mockup case study with discussion building on issues raised in previous workshop	ACARP monitors, EHP staff, summary of technical information

Source: Prepared by the authors

3.1 Participants

The participants in the first landholder workshop predominantly represented grazing livelihoods (or were active in rural land management) and most also had some experience of mining or rehabilitation having interacted with mining companies or worked in the mining industry as well as pastoralism (Table 1). A couple of participants served as "resource" points – people with knowledge about government processes and mining operations.

[1] A 'boundary object' may be abstract or concrete. It may be interpreted differently by various peoples or groups but has commonalities that are recognised by all and allows meaningful collaboration and communication.

For the second landholder workshop, the participants were a mix of landholders, natural resource management groups, regulators and mining industry personnel. Again, most also had experience interacting with mining companies and some had worked in the mining industry as well as pastoralism.

A subsequent workshop involved participants who were a mix of landholders, natural resource management groups, regulators and mining industry personnel, with most having attended at least one of the previous workshops. This workshop confirmed that participants agreed with the synthesis of group views from previous sessions.

The project researchers facilitated each of the workshops. In every workshop, participants were grouped such that the workshop conditions simiulated how an actual panel was anticipated to operate.

3.2 Purpose

The main purpose of the first landholder workshop was introducing the issues to the landholders using a 'mock up' of a mining tenement (Figure 2). This showed a number of typical domains – void, subsidence, watercourse diversion, spoil piles, steep land, industrial site etc., noting that a post-mining landscape would evolve 5, 10 and 15 years after mining activity ceased. In this way, this 'hypothetical' case demonstrated the key domains and issues that would require consideration for about 80% of large mine rehabilitation and closure situations. The participants were posed the challenge of proposing acceptable future uses (and management) of the land from a grazier's perspective. Minimal background information was provided, except to reiterate the Queensland government's broad closure goals of land being safe, stable, non-polluting and with an acceptable and sustainable land use.

The second landholder workshop commenced with an update from the previous workshop, and expert presentations giving a summary of parallel developments in the policy space; long-term mine water management from a regulatory perspective; the "three-point surrender process"; grazing trials and a short video of land rehabilitation at Rolleston Coal mine in Central Queensland (CQ). The overall purpose of the second landholder's workshop was to incorporate the expert knowledge and the pooled individual suggestions from the previous workshop to agree a group solution. Participants worked in four groups that each consisted of landholders, natural resource management personnel, government personnel and someone from the industry. Each group discussion and mapping exercise was observed by one of the four project researchers. The groups reflected on the available resources, skills, expertise and systems to plan for the desired land use change – building on the best ideas from last session, identifying new information needs, and determining what would need to happen in order to facilitate the transition to the preferred land use.

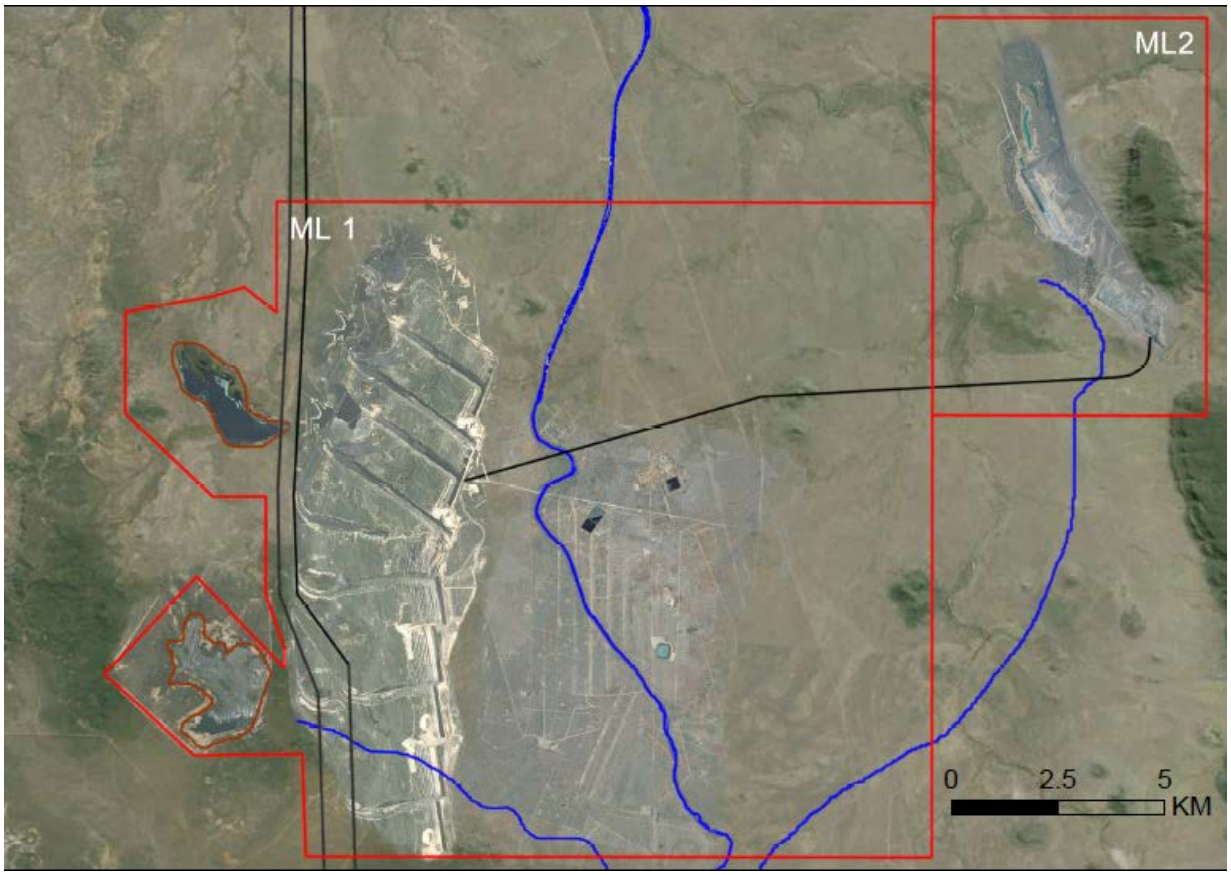
3.3 Workshop simulation exercise

During workshop 1, participants were presented with aerial views of two adjoining mining leases with a combined total area of a little over 26,000 hectares (see Figure 2). Around half of this area was un-impacted 'buffer' zones, while the low impact areas (such as roads, railways and industrial sites plus the areas of significant disturbance such as the pits, spoil heaps and tailings dams) totalled almost 11,000 hectares. Participants were also provided with a series of more detailed images of the following disturbance features evident on the overall view:

- void – overall, high-wall and low-wall;
- ramp;
- subsidence area (related to underground operation);
- rehabilitated box cut spoil (recent, 5 years and > 10 years since establishment);
- tailings dams with various levels of treatment.

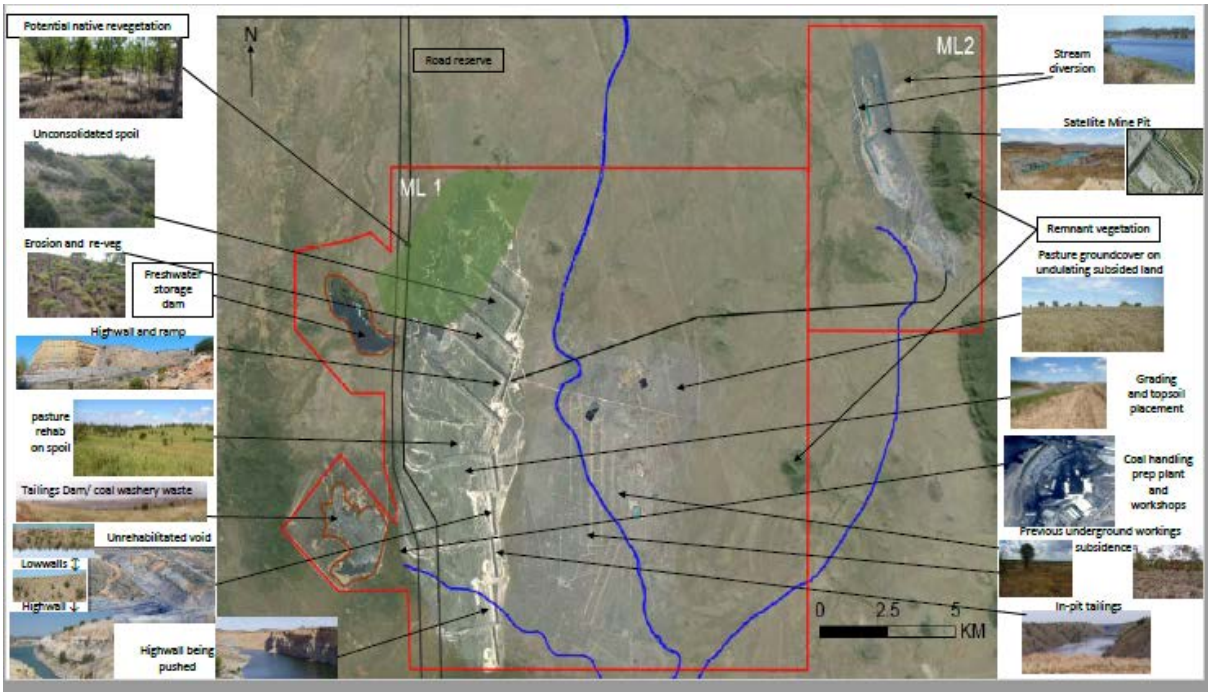
Assuming the role of potential future land users/ neighbours, participants were asked to envisage this was a property in close proximity to their own which was coming to the end of its mine life, and that the current owner was seeking to transition the area to grazing as the post-mining land use. One of the representatives from the mining sector was available to answer questions about the site (in a broad sense, given that it was a simulated scenario). Many other participants were also very familiar with mine site visuals, and thus were able to elaborate with practical interpretations of the maps, for their peers. Participants also had access to a set of images of various end-state domains and stages of rehabilitation to illustrate the conditions.

Figure 2: A hypothetical mine with typical domains used in the first landholder workshop



During the second workshop each group again worked with the same hypothetical mine site however, this time the maps were annotated with thumbnails of the features rather than those images being disconnected (see Figure 3).

Figure 3: Hypothetical mine with typical domains identified used in the second landholder workshop



4. Findings and Analysis

4.1 First landholder workshop

This workshop elicited individual landholder's perceptions, experiences and local knowledge about neighbourhood and site level issues about the mine closure and ex-mine land use. In addition the workshop elicited individual landholder's perceptions of what land use would they envisaged and why through a planning exercise with a hypothetical mine. Analysis of these findings is given in Section 4.3.

4.1.1 General comments about grazing as a target end use

It was noted that mines that had been developed earlier in Queensland were not required to specify an end-use or have relevant post-mining or rehabilitation conditions, as part of regulatory practice. This is distinctly different from contemporary operations, where a proposed end use is nominated at the approvals stage. In the Bowen Basin, grazing is common as the prior land use, and historically, this was a rationale for citing grazing as the end use. However, one participant noted an increasing tendency in recent years to favour trees over pasture as the re-vegetation strategy; with another commenting "it's an easy fix to turn it into bushland, but it might be more sensible to put mill-able timber on it for example".

Some workshop participants indicated that defining the likely subsequent land user as grazing was too restrictive, and advocated for a more strategic, forward-looking strategy over the 'return to original land use' status quo. Nevertheless, many participants agreed that grazing (probably by a neighbouring landholder) was likely to be the primary feasible option for much of the Basin's mining country, noting that the 'bottom line' was "can someone make a buck off it". In some cases, neither pasture nor bushland is likely to result in an economic asset, given the often marginal profitability of some properties in the broader Bowen Basin. Thus, the need for lateral thinking about a range of possibilities and land users was endorsed by many in the group. A participant observed that the underlying assumption seemed to be that "individual yeoman farmers" are the default land users in rural Australia. It was suggested that this may be a thing of the past.

4.1.2 An ideal scenario for post-mine land uses?

Workshop participants noted that there are some factors that will be site-specific and could not easily be extrapolated from the hypothetical scenario – such as soil types, slopes and rainfall patterns. It was expected that these would routinely feature in a land manager's assessment of the productive potential and stewardship requirements of any property. An important note made by participants was that land users do not require every hectare of the property to be productive; nor that it be uniformly used – though participants had varying opinions about the extent to which they would fence out/exclude some areas of land 'you can't do anything with' from active management land. Landholders indicated they would consider management of different domains separately, and during the workshop session, this introduced much variation in management propositions about specific issues such as where fences might be located; whether to use continuous, rotational or cell grazing; and specific timings and stocking strategies for the property. Most participants indicated these matters would all be subject to a flexible management approach with continual monitoring (of varying degrees of formality) as the basis for adjustments.

Importantly, participants indicated that the ideal situation would be to achieve a clear (but not rigid) vision of sequential land use from the outset of mining operations, with on-going and consistent negotiations and dialogue over time to establish mutual expectations. However, the reality is that many mines, which are approaching closure, may need to establish an agreed land use after the mine has operated for years without necessarily following that ideal procedure. The challenge becomes making the best use of what has been left behind. These situations suggest potential variations in engagement processes aligned with stages of mine life and likely timelines.

4.1.3. Common issues of concern

Despite individual differences in management styles and proposals, and differing degrees of risk aversion, some issues emerged as common considerations for most participants, relevant to post-mining leases in contrast to a regular property acquisition. These can be grouped into the overall categories of physical assets and infrastructures; system implications; expert input; and stakeholder involvement.

Physical assets and infrastructure

- *Water resources* were regarded as crucial – especially secure access to water of satisfactory quality. "You can turn rubbish country into good country and make money out of it (if there's water)".
- *Property access*, including getting to and between use-able sections – especially for stock and machinery, needs to be efficient. Some participants were very critical about settling the access to property before transfer the property stewardship or ownership. Landholders were particularly keen to know where the responsibility and financial liabilities lie, for maintenance work on the road network inside the mining lease area, as currently managed by the mining companies. It was suggested that local government and/or mining companies may have a role in this post-mining.
- *Responsibility for major legacy issues and residual risk* was something new land-users would be loathe to assume and would need clarified. This particularly related to the tailings dam as a domain perceived as high risk. Key examples of responsibilities deemed to remain with the mining company (or some specific management arrangement like a 'contaminated lands authority'/ bonding or insurance scheme included:
    - contamination and leakage;
    - extensive infrastructure damage by subsidence; and
    - weed and pest infestation.

Some participants suggested building a strong fence around the tailing dams to control or minimise the environmental impacts, but nonetheless held concerns for unprecedented natural hazards, such as a huge

rainfall event which might overflow the tailing dams. Some participants even suggested to fence off the entire mined area (i.e., the two actively mined areas as presented in the mock mine exercise) and grazing only the non-mine and mine-services areas. However, landholders were also critically interested in the carrying capacity of each of the properties.

The vegetation cover was another particular interest – including information on how it had been maintained (e.g. some grass species need grazing to infill; some bush/tree species are thorny and hard to muster through). It was noted that some bushland areas can be attractive (e.g., for shelter, conservation and various other functions). However, some participants noted that it was undesirable to have bush that provides a refuge for feral animals. It was noted that ripping of some areas and leaving to 'natural' seeding can stimulate noxious weed growth which outcompetes any exotic pasture species. Some pastures being exotic species was not necessarily negative. It was noted that these can enhance the soil (e.g. legumes), which was a positive asset. Generally, participants indicated that removal of rubbish on the property was preferred; but this was not necessarily the case for all infrastructure, with compacted areas and roads, power, bores, pipes and other items often being regarded as useful resources for the new land owner. Given this, the participants noted that, ideally, one-on-one negotiations should be held in regard to these specifics, during the transition process. Legal requirements of land use change or owner ship change were also highlighted by a couple of participants.

System implications (framework for transfer of land use)

Participants raised some issues about the procedural steps that would be observed during any transfer of land use, and how this might incentivize, or disincentivize a landholder to assume stewardship. For example, these include:

- possibility of discounted rates for degraded areas – this might possibly be covered by valuation processes, but clarity is needed and could be sought from either Local Government and/or the state lands department;
- an established, rigorous monitoring program in the lead-up to transfer and beyond was seen as very desirable; especially as participants acknowledge that 'settling' and concentration will continue in the short-term horizon, and that this may be ameliorated or compounded by natural processes. More information on this could be sought from mining companies and DEHP;
- clarity about covenants/conditions, either in titles or in contracts of sale. This conversation also covered transfer processes to maintain encumbrances through successive owners;
- satisfactory arrangements in regards to liability for any legacy issues and the residual risk/ catastrophic failure associated with post-mining lands;
- transparent information about past performance of the property, and information that would be helpful for forward planning such as projections, timelines, probabilities etc.

Some of the issues could be the subject of general guidelines – for example, those already in place through DEHP – but these could be revised to recognise and address pastoral priorities. For instance, reducing the height, depth, slope and other factors for voids and waste heaps should not be determined solely on the basis of erosion and stability concerns, but should also consider impact and (unintended) consequences of standards: e.g. detraction from surrounding valuable land.

Expert information/input

Participants noted a range of information that would be valuable to provide as part of the process (and preferably, at the second research workshop):

- expert insights into identifying 'sleeper' risks; residual risk assessment and risk management;

- case studies – reporting on what has been tried elsewhere; what worked (or did not work) and why;
- cost estimates – understanding what costs companies might face to undertake various rehabilitation scenarios, so as to understand some of the trade-offs and what are within reasonable bounds of expectations. For example, it was noted that rehabilitation can be $30,000 - $100,000 per hectare depending on soil type, depth of voids, the length of time of active mining and the quality of advanced planning). A key expense relates to moving the ground, with a strong preference that large volumes of material such as spoil are shifted only once. There was also a recognition that 're-purposing' for other industries (grazing, energy projects such as solar-hydro cycling etc) may be attractive, but this would need the support of private investors, which had not yet emerged across the Bowen Basin.

Wide stakeholder involvement in decision making

Participants were asked to identify stakeholders whom they felt should be included in the decision-making process for transfer of post-mining lands, and the following list was compiled:

- Local government – especially where there are single-industry 'mining' towns and where the employment impacts will be dramatic;
- Other industries and private sector players who can see entrepreneurial opportunities for the land or in the transition processes;
- DEHP – especially officers who've experienced other sectors such as mining or agriculture;
- DNRM – including perhaps the abandoned mines unit;
- Natural Resources Management (NRM) groups such as FBA (Fitzroy Basin Association);
- Hydrologist and/or water experts;
- National Parks and Wildlife Service;
- Engineers including mining engineers and environmental engineers (e.g. independent consultants); and
- Environmental officers of mines (albeit to a limited number, so as not to drown out the other stakeholder voices).

4.1.4 Summary of key findings: First landholder workshop

Findings from the workshop are:

- The validity of joint risk assessment and management (by company, future land user and perhaps government and others)
- The relevance of risk, ways to handle residual risks and who are responsible for what risk.
- The importance of moderated or facilitated negotiation over time
- Long-term relationships with neighbours over time are a mine's key assets
- Recognition of many individual differences (and site differences) – rather than 'one size fits all' process and outcome
- There are some key issues e.g. tailings, water and access
- The complex array of factors determining perceptions of some domains and the opportunities and challenges they present eg voids – it is not just the size, depth and slope, but also permeability, usefulness of surrounding land etc.

Lessons from the workshop are:

- Demonstrated a range of valuable expertise can be tapped among selected landholders
- Showed that familiarity of other sectors' work and priorities is valuable – it cannot be assumed all landholders are equally 'savvy' and some information/ resources should be available to ensure the 'level playing field' that is critical to empowerment processes

- Suggested a challenge for panel processes is hitting the level of generality that will be relevant to a broad range of people and still keeping that flexible enough to apply to the specifics of an individual site and 'designated' subsequent land user (where one-on one negotiations will be important).
- Illustrated that despite differences in individual management styles, one outcome was that some areas of 'consensus' emerged (about what people can/ can't live with)
- Indicated potential for using maps and visual aids as discussion stimulus and a basis for concrete discussions, but also suggested refinements of these needed including labelling of key features, linking to close-up/ land level views, and representation of contours.

4.2 Second landholder workshop

At the previous workshops for this project, the assumption that grazing should be the primary consideration for any subsequent land use was questioned; however, it was also acknowledged that in Central Queensland, graziers are the most likely individuals to take on post-mining land parcels – albeit this could be for potentially diverse uses (e.g., a patchwork of grazing and other uses).

At the outset of the workshop, it was noted that 'rehabilitation' was interpreted differently by various people. For example, some mines may never be fully rehabilitated (such as Moura Mine and South Blackwater Mine). However, those under Special Agreements Acts have been transitioned to the new legislation with licenses and leases subject to Environmental Authorities (EAs), which require progressive rehabilitation and financial assurances. A separate issue that was discussed related to the "$1 sales" to Stanmore, Batchfire and Orion/Terracom whereby ownership of depleted mines and associated liabilities is passed to smaller companies.

In addition, there was discussion about how to introduce the expertise and knowledge of landholders and others in the local area into the closure process. The point was made that many closure issues are locally specific – hence the importance of seeking input from locals (as opposed to state-wide stakeholders). It was also noted that, under new Queensland Government guidelines, mining companies have to demonstrate that the community accepts what is being prepared – however at this point, there is no clear process for demonstrating this within the Bowen Basin. Thus, this workshop was designed to (help) populate that gap.

4.2.1 Key findings from the expert presentations

Several expert presentations were made during the workshop. The first presentation focussed on long-term mine water management from a regulatory perspective. This noted that the existing licensing system set out the conditions for the coal mines to operate, and all model mining conditions and licences are publicly accessible on the website. Furthermore, the DEHP provides notification of all releases online within 24 hours of the event, and that Department also provides a cessation report. After this presentation, workshop participants discussed water management, noting that tailings dams were identified as a major waste stream for mines, with participants concerned about storage failures, acid mine drainage and seepage, and links to topography, design, build, structural stability etc. Currently, the mining companies calculate disturbed land annually and report this to the department together with liability calculations and the (proposed) next course of action. Workshop attendees noted that proactive monitoring for seepage detection, capping type and vegetation choice (e.g. avoiding deep rooted vegetation that may breach the capping) can help reduce contamination. The government representative also outlined a "three-point surrender process" as follows:

Firstly, rehabilitation assessment is to be completed by the government department (DEHP). Secondly, lease surrender will not be approved (by DNRM) unless there is approval of the rehab assessment. Thirdly, every mine has a financial assurance to deal with residual risk at the end of mine life (i.e., a sum of money is

required to resource long-term monitoring and attend to any incomplete or emerging remediation requirements).

Wall failure in a tailing dam was identified as one of the major risks, which can be addressed by draining, capping (double capillary) and re-vegetating. Voids are identified as second major risk followed by stability of levees, temporary or permanent stream diversion, voids in the flood plain, run off and downstream water quality issues. However, some stakeholders agreed that water quality varied from site to site and in some cases, water quality would be suitable for agricultural purposes. The type of ongoing management regime would play a significant role in performance, sustainability and viability of sequential land uses and need to be somehow factored into transitioning of areas. However, questions were raised about who will be responsible for long term stewardship.

Some background information on a grazing trial was presented, however most information was anecdotal and questions remained about its replicability to other mining sites. Landholders who attended this workshop stressed the value of comprehensive information including risk assessment reports before they could decide whether they would take up the land or not. This risk assessment could include water quality (past, present and likely in future), soil quality, contours and usefulness of exiting pipes and roads on the property. Landholders would also further look for expert opinions on water, soil, slopes and land use option as well as a clear explanation about how to deal with tailing dams.

4.2.2 Open ended discussion (Post expert presentation)

During the course of the discussion, the stakeholders also noted matters that were not yet dealt with, but which stakeholder processes could help in tackling, included:

- Exploring options for early transition to grazing (with regards to interest/incentives)
- Answering questions especially about standards and rehabilitation formulas. For example, whether slopes and vegetation mix have adequately considered stakeholder requirements (It appears common to work to 10°-18° slopes, however it was queried as to whether that is a manageable angle for graziers). The use of contour banks was also queried: as engineered 'structures', contour banks were recognised as having a finite life cycle and needing ongoing monitoring – hence leaving the question of whether they should be incorporated into the landscape or not. With regard to vegetation, common species may typically include bluegrass on red soil; or self-mulching species on steeper basaltic soils, but the suitability of these for grazing purposes was queried. There was also a re-iteration that arbitrary standards are not meaningful – some slopes with good soils can be quite stable despite steep angles; other low inclines can be very prone to erosion with dispersive spoils; and stabilisation costs to reduce slopes can sometimes neutralise any gains.
- Ensuring holistic catchment requirements are captured
- Building-in discussions about risk
- Proposing roles of covenants, tenders, bonds and insurance to handle ongoing management and risk, and how this links with (or may be linked with) lease/ tenure arrangements.

4.2.3 Post-Mining Land Use Simulation – Group exercise

At the end of the introductory session, the outputs (maps) of landholder workshop one were presented and explained, to provide further context about what project work had already been completed. Following the expert presentations, the workshop then moved to a post-mining land use change exercise based on a mock-up mine map; which repeated the exercise from the previous workshop, but this time utilising a group format rather than an individual format. The exercise involved identifying options that are acceptable to communities and which fit with the processes of changing land ownership (from mining to post-mining).

Participants and the facilitators were divided into four groups and provided with a map of a 'hypothetical' mine site. All groups had the overall objective of managing the whole land as a grazing enterprise, including some identified risky areas (i.e., coal processing plants, tailing dam and open cut areas).

Group 1 had a general preference to develop a biodiversity corridor towards the top east-west boundary; and using the rest of the land for grazing except the high-risk areas. Most group members were looking for technical reports/ information as part of their due diligence, for example:

- geo-technical reports on stability of dam walls; and
- hydrological reports regarding both quality and quantity of groundwater – historical reports and modelling projections.

It was noted that the rehabilitated spoil heaps were likely to be an erosion zone – this could be managed for grazing, but the landowner might prefer for it to be lightly wooded. Any grazing would be 'pulse-grazing' to consolidate pastures but minimise negative impacts. Straight pasture (with no trees) was not seen as useful. Thickly treed areas that can't be grazed were not favourably regarded either.

The group considered that riparian zones of 200m should be established either side of major stream and 50m either side of minor ones. These should not be completely fenced off and impassable, but rather able to be lightly grazed at times, and allow for transit and river crossing.

Finally, the risk of subsidence over underground workings was not seen as a major issue – it was considered that it would be possible to graze there and any ponding of water would not be difficult to handle.

The group 1 consensus was in the following areas:

- not all areas need to be grazed (i.e., some environmental objectives could also be achieved);
- there needs to be some commercial value to a large part of the property; and
- The key considerations for any purchaser would be: what are the assets? What can I learn from due diligence reports?

Group 2 looked for both biophysical and economic feasibility of the land, requiring more scientific and professional information about soil type, possible contamination, stability of long-walls, and available asset and production value (such as what stock to run and how long a time span to consider). The group indicated that they wanted professional risk assessments to be done before any land transfer, as well as clarification of responsibilities for future risk management. However, if a decision was made to take over the land from the mining company, the group suggested that the tailings dam should first be capped and both the fresh water dam and the river be available for water resources. They were not keen to look after the roads and pipelines used during the mining that were no longer required for grazing.

The group 2 consensus was in the following areas:

- It is important for the company and landholder(s) to talk together; and
- Decisions on how viable the post-mining land use would be was likely to be an individual land manager's judgement (as opposed to a group assessment)

Group 3 had a strong focus on setting aside the tailing dam and using most of the other land for grazing purposes. First, they discussed ways of managing water availability and quality on the land covered by the mining lease. They proposed to create a concrete wall to block the tailing dam as well as to fence off the coal facilities, unconsolidated spoil and non-rehabilitated void. However, the group were also interested in

using the void as grazing land in the future, if it were to be rehabilitated. They also planned to grow riparian vegetation along the water courses to preserve water from any possible contamination. Some of them suggested to establish some permanent and semi-permanent water dams for supply of water for their cattle.

This group considered that significant fencing would be needed to use the land optimally. They divided the whole area (excluding tailing dam, coal facilities, unconsolidated spoils and unrehabilated void) into nine grazing paddocks for rotational grazing. In addition, they proposed retaining the remnant vegetation area "as-is". All group members were very concerned about any future risk from the final void or tailing dams. They suggested there should some type of financial and legal support or very clear cut mechanisms to ensure no liability to the land owner if there is any future failure in the tailing dams and void walls.

This group indicated that they would like to use the existing pipes, fencing and power lines, where these could assist their grazing activities. They noted that access to the site was important and may require a connecting road to the nearby road. Currently the mined land has scars from long-term environmental disruptions, so it would require long term environmental stewardship before it transfers back to grazing land. They also noted that it is a risky exercise to make decisions on their own, so they wanted an external (science) expert to be employed to understand the bio-physical and water contamination risks before they took over the lease from the mining company.

The group 3 consensus was in the following areas:

- Developing a (viable) business enterprise would be possible; and
- It would be useful to utilise most of the land for grazing purposes, whilst also looking for a viable process for dealing with risk areas.

Group 4 was focused on the rehab area, the ramps and the pits, however, it appeared very difficult for the group to reach agreement. One focus of discussion was how to re-form the rehab sites, given that there are very steep slopes from the top of the rehab areas down to the ramps. One option was to batter the rehab areas down to fill up the ramps and take out the stark variations in topography. The disadvantage of this was that it would involve some loss of already rehabilitated areas (devegetation). The pits also need to be blasted along the sides to avoid the steep slopes and develop a better batter. They would still have water in them so would require some level of exclusion. Another viewpoint was to just leave the areas as they are, but to focus on creating some flatter areas in the rehab zone that could be used for specialised crops such as biofuels, timber or wildflowers.

There was spirited discussion about what the rehabilitated areas would be useful for. Two people in this group were suspicious of grazing, arguing that the soils and slopes would be too fragile to sustain grazing pressure. Other options suggested were goat grazing, timber and biofuels (e.g. giant elephant grass). This would involve terracing the rehabilitated areas so that some better quality land could be developed. The argument was that it would require specialised investment by the mining company into something like this to ensure that the land could be productive for another purpose.

The tailings dam would be fenced off, and ongoing monitoring sites should be set up. Some members in this group did not regard the tailings dam as a significant source of risk if the tailings dam was locked up with concrete walls and then "let nature do its thing". They viewed residual risk as low, if the dam was sound.

Some members of the group saw it as too risky to have cattle on the spoil areas. The subsidence area (underground mining) would be used for cattle grazing. Members were concerned about proximity of the stream diversion to the adjacent void, so saw that this could be returned to bushland to create a native vegetation area. The subsidence area would return to pre-mining use e.g., grazing.

The group 4 consensus was in the following areas:

- The main concerns are about who will monitor, where various responsibilities will lie, and the potential use of insurance and warranties to cover unexpected events; and
- The group members expected that due diligence would need to be done by the departments and there would need to be careful management by the subsequent land user.

However, it should be noted that there were also quite disparate views; as the majority did not agree about using spoil areas for cattle grazing, although some suggested using goats because of slopes, changing nature of vegetation and water quality.

4.2.4 Summary of the key findings: Second Landholder Workshop

A majority of the stakeholders were in favour of transferring the mining land into grazing land with a mosaic that included some biodiversity and conservation options, noting that:

- developing a (viable) business enterprise would be possible;
- not all areas need to be grazed (i.e., some environmental objectives could also be achieved);
- there needs to be some commercial value to a large part of the property; and
- some participants had reservations about using spoil areas as grazing land.

The group noted that due diligence is required before transferring the land use and land ownership with transparent and trusted scientific assessment required on tailings dams, water quality, soil quality, slope and vegetation.

Furthermore, clarity is needed about:

- Who will monitor
- Who bears responsibility
- Mechanisms to cover unexpected events
- Careful management by the subsequent land user and any constraints on them and
- Role of the departments (probably need to do the due diligence).

Landholders should be part of the decisions about processes and standard of land use transfer.

- It is important for the company and landholder(s) to talk together,
- Some decisions are likely to be an individual land manager's judgement (as opposed to a group assessment)
- Also need a process for dealing with risk areas and residual risks.

4.3 Sign-off workshop

In a subsequent workshop, a consolidated map of the dummy mine planning exercise was presented to the group for review and endorsement. Attendees confirmed that they would be prepared to support the consolidated version of the plan. This stage effectively was the final of a sequence of five steps:

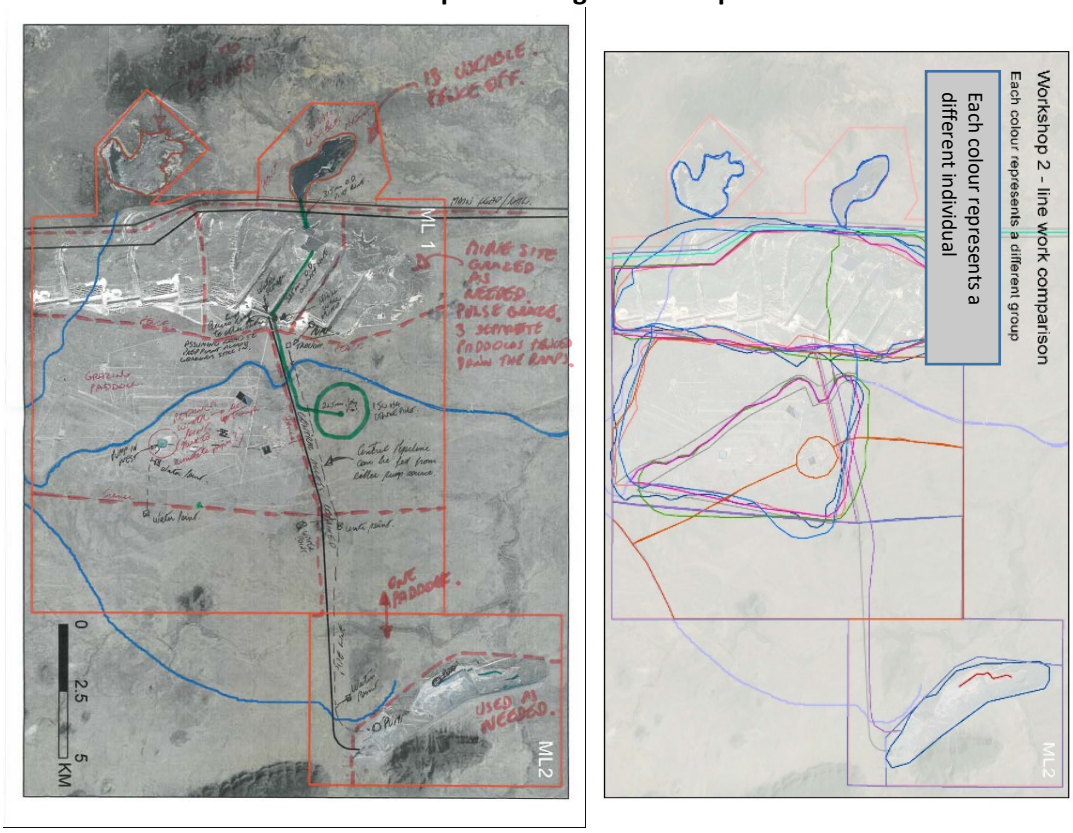
- Identify relevant issues and areas where extra information is required (Workshop 1)
- Individual priorities and interests for planning at site level (Workshop 2 – 1st landholder workshop)
- Provide expert information to the group (Workshop 3 – 2nd landholder workshop)
- Group planning exercises for post-mining land use change drawing on experience (Workshop 3 – 2nd landholder workshop)
- Technical input to consolidate plans (between workshops) and Confirmation that the final plan met stakeholder approval (Workshop 4).

In a case study setting, it is likely that there are more feedback and planning loops between the group planning exercises and final confirmation (i.e. additional meetings may be required to generate consensus). For this project, a deliberative process of discussing the diversity of views as well as uncertainties and information needs preceded an exploration of the extent of and means for convergence of different positions (van de Kerkhof 2006).

4.4 Analysis of the Hypothetical Mine Mapping Exercises

As mentioned earlier, in the first landholder workshop participants were asked to develop their own plans for post-mining land use using a standard 'mockup' of a mining area. There was a lot of variation in the ideas and land uses suggested, although similarities in the identification of key domains. The figures below show an example of the most detailed individual map as well as a summary of the eight maps generated at the workshop (Figure 4).

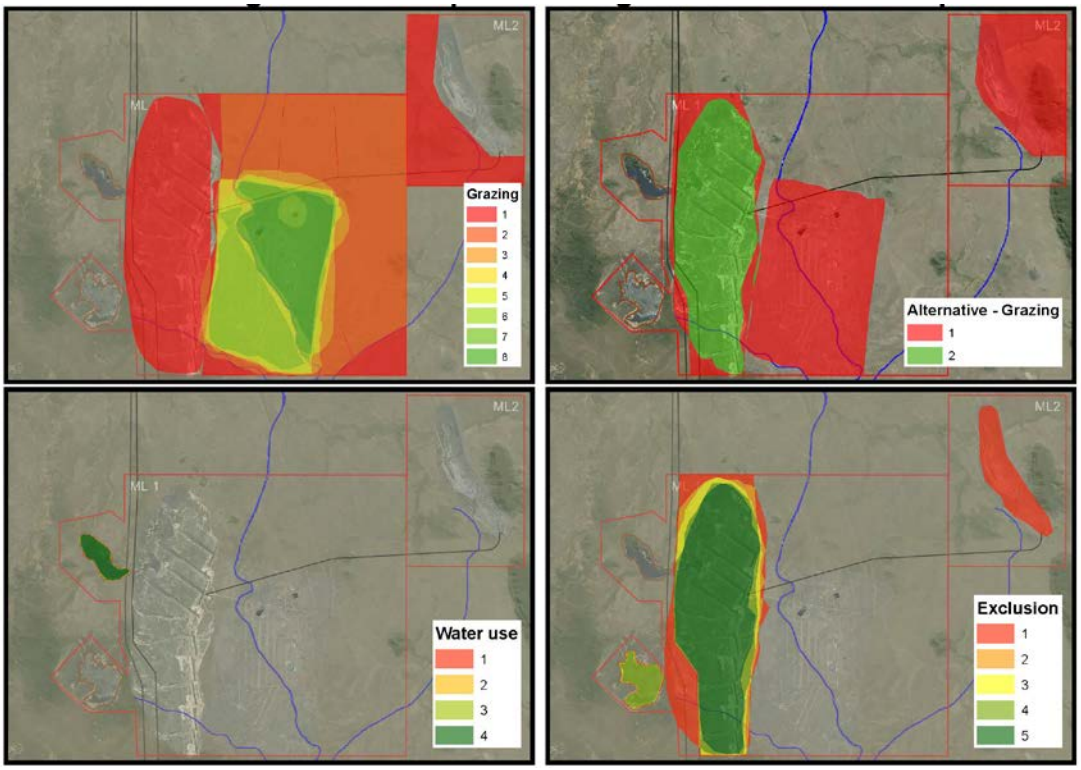
Figure 4: (Left) An individual stakeholder's post-mining land use options; (Right) Summary of individuals' post-mining land use options



The level of agreement about different treatments of the mine domains is summarised in Figure 5. This shows that there was:

- Limited agreement about grazing spoil areas (only 1 of 8 landholders would graze)
- General agreement about grazing longwall subsidence areas (between 5 out of 8 for part and 8 out of 8 for the rest)
- Some suggestions of using for alternatives to grazing (2 out of 8 landholders for spoil areas)
- General agreement about use of water reserves (all agreed these were valuable)
- Majority agreement about excluding tailings dams (4 out of 5) and spoil areas

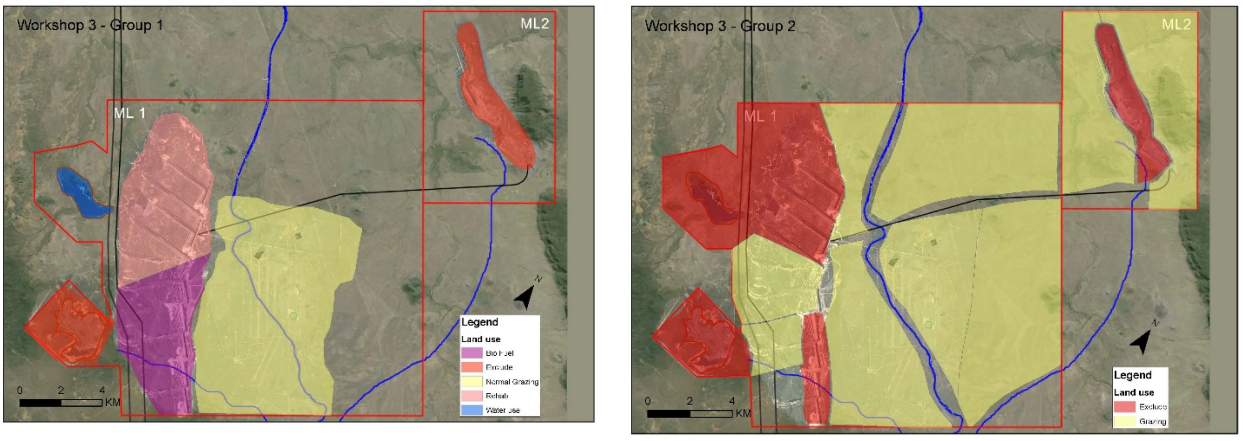
Figure 5: Level of agreement about post-mining land uses



In the second landholder workshop the 'mock mine' map exercises were repeated, but this time participants were grouped into four panels of 5 people, with members in each panel from a cross section of interests. Each group had to identify their preferred post-mining land use and identify it on the map (Figure 6). Three of the four groups completed the exercise, while one group did not reach enough agreement to be able to provide results at a summary level. Results from the group mapping exercise indicate:

- Group assessments tended to be more thorough and detailed than individual assessments
- There was more focus on landscape level issues than in the individual assessments
- There was still large divergence in proposed land uses between the different groups
- The issues that were important to each group varied, and appeared to be driven by the interests of individual members

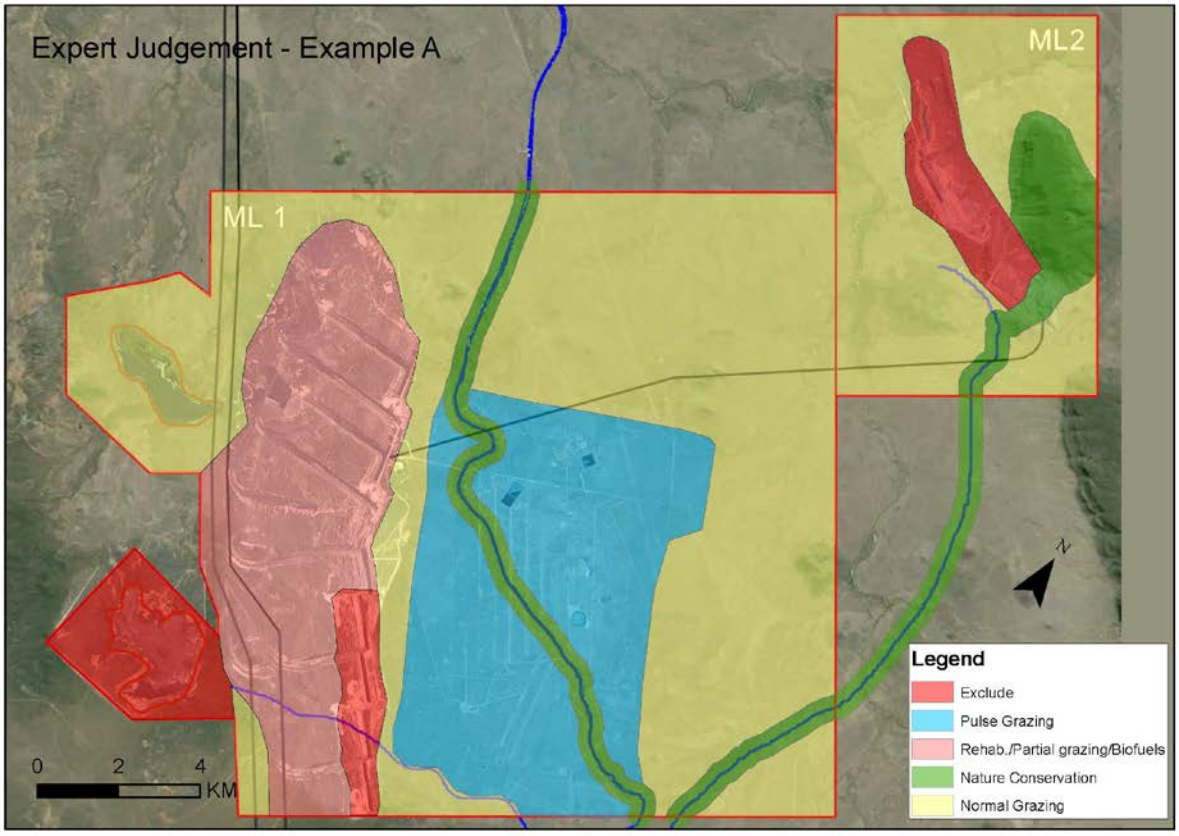
Figure 6: Different groups' post-mining land use options



An example of a technical summary of the mapping exercises from the second landholder workshop is provided in Figure 7. This selects the most cautious outcome from each group for each domain, assuming that if the groups had to negotiate a combined outcome that the groups might be more inclined to agree about areas to exclude rather than uses of specific areas. This is consistent with an Expert Panel approach, where members would set broad directions and then technical staff would provide draft plans for further consideration. Under this approach:

- the un-mined land would continue to be grazed as normal,
- some areas would be re-established to biodiversity,
- there would be controlled/pulse grazing on underground mined areas,
- some spoil and pits and the tailings dam excluded from grazing, and
- some spoil areas would be rehabilitated for limited grazing or alternative agricultural use.

Figure 7: Experts' technical synthesis of post-mining land use based on the groups' plans



5. Discussion and Conclusion

All mining operations in Queensland are required to undertake rehabilitation, and government regulators assess whether rehabilitation is satisfactory before a mining lease and associated legal responsibilities can be relinquished. However, to date, neither the regulator nor the mining industry have established effective or standardised processes to engage the local and/or regional landholders in making decisions about post-mining land use.

This study identified that biophysical, process-oriented and socio-economic factors each influence landholder's decisions in planning for post-mine land use. However, a facilitated group process is useful to assist with identifying best-case options and general acceptability. With respect to this, some key conclusions were:

- Although a framework of expert standards (through government regulations) was appreciated, there was strong endorsement of a voice for stakeholders in the process. Stakeholder-driven working group formats were welcomed as a suitable process in general terms though more confined negotiation between landholders and companies was deemed appropriate for specific cases or specific stages of the transition.
- Decisions about the value proposition of an ex-mining lease to a grazier will be very site-specific and only be able to be calculated about specific land packages at the relevant point in time.
- Dealing with environmental risks and the potential for unanticipated future issues (such as subsidence, contamination or other residual risks) is very important. This is likely to lead to more rigorous expectations by the prospective land users. For instance, independent information and clarity around the condition of tailings dams and inherent risks and liabilities associated with them, and similar assessments of spoil heaps and voids should be available.
- Some ongoing role for the government may be unavoidable, but this should be considered in a broader context of effective stakeholder consultation by the mining companies.

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