

Towards a framework for the sustainable use of legacy mine land in Queensland, Australia

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Presentation overview

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Introduction

- Global mining industry embracing sustainability concepts
- Legacy, abandoned, derelict and orphan sites a major issue for industry, community & NGOs
- Low profile in the research community

Mining impacts in Australia

- Current practice leading edge
- Several major regional areas with a significant mining relationship
- Significant legacy of mining - acid rock drainage, acid rain, erosion, fatal explosions

Estimate of abandoned mines in Australia

State or Territory	Number of abandoned mines (approximate)	Quality of information
Queensland	12,833	Average
New South Wales	570	Good
Victoria	2,000	Average
Tasmania	30	Good
South Australia	4,000	Average
Western Australia	11,000	Average
Northern Territory	Unknown	Poor
Total	30,433	

* Updated from paper

Study area



Study area

- Located between Brisbane and Ipswich, Queensland Australia (combined population of 1.3 million +)
- Major coal producing region of Queensland from 1830s to 1960s
- Initial production from underground operations, with open cut operations beginning in 1967

Current activities

- Mining ceased in 2003
- Little rehabilitation of any mine land
- Approximately 2,300 ha disturbed by mining activity
- Current land use includes clay extraction, waste disposal and landfill operations

Future activities

- Plans exist for new industrial activities to be located in the area – paper manufacturing, metal fabrication and power generation
- The area will be virtually enveloped by current or planned urban development

Measuring sustainability

- Criteria and indicators becoming a well established paradigm in resource sectors – mining, forestry fisheries
- Sustainability criteria and indicator sets need to balance social, economic and environmental concerns
- Indicator sets for active sites can be large eg. GRI 110; Azapagic 131

Measuring sustainability

- Legacy sites most closely relate to mines at the closure stage
- Legacy mined land defined here as *“land which has been mined and is now being used for another purpose or is abandoned, derelict or in need of remedial work”*

Criteria & indicators

- A research review suggests legacy mine land sustainability criteria and indicators should:
 - Consider equally environmental, social and economic factors;
 - Criteria should be more specific than just these three principles;
 - Indicators should be easy to identify and measure;
 - Indicators should have a meaningful output;

Criteria & indicators

- Indicator numbers should be kept to the minimum needed to convey the message;
- Aggregate indicators could be used to provide a simple sustainability 'snapshot';
- Needs to consider particular requirements of the site being investigated – in this case, examples include complexity of land ownership, competing landuse proposals, relative proximity to future urban growth areas and capacity of third party agencies to undertake rehabilitation work.

Criteria & indicators

- An initial set of criteria and indicators has been developed
- The list is not yet comprehensive, but serves as a discussion point
- It is currently biased to the Queensland regulatory environment
- A more generic set is being developed

Legacy site criteria & indicators

	Criteria	Indicators
Environmental	Conservation of biodiversity	Flora species, fauna species, ecosystems, endangered species
	Rehabilitation	Area completed, area remaining, biophysical conditions
	Off site impacts	Visual, noise, dust, hydrological
	Integrated landuse planning	Government plans, future landscape scenarios, adjacent landuse plans, urban development
	Ownership	Historically, current
Social	Responsibility	Government level, private ownership, legal action
	Cultural issues	Community engagement, indigenous concerns
	Health and safety	Community safety
	Productive land use	Area, current uses, future plans, economic benefit
Economic	Local economic contribution	Indirect and direct employment; multipliers
	Cost of rehabilitation	Dollar cost, funding sources, agency responsibility

Future research

- Feedback will be gathered on the framework from an expert stakeholder group, using the Delphi methodology
- This iterative process will be used as quality control for the final generic criteria & indicators set

Conclusions

- The use of criteria & indicators as tools for measuring sustainability of mining operations is now well established
- Legacy sites, an acknowledged issue for the global mining community, have received relatively little attention
- Given the particular challenges of these sites, there is a need for appropriate criteria and indicators to guide decision-making.