BE WHAT YOU WANT TO BE

Assessing the success of ecosystem rehabilitation on open cut coal mining in the Bowen Basin, Queensland Australia

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Structure of Presentation

- Introduction
- Aim of the Study
- Approach
- Beneficiaries

Acknowledgements:

Qld State Gov and ACMER - Scholarship.

Xstrata Qld Coal – Newlands Coal Mine – Stephen Thorne and Trevor Spedding

Introduction - Background

- EPA figures increasing gap (since 1990) between disturbance and rehabilitation
- 16% of 70164 ha disturbed, is being rehabilitated.
- Lack of consistent and scientifically acceptable restoration success measures
- Uncertainty of sign-off
- FA bonds \$12,000.00/ ha.
- = >\$30 million for larger operations



Introduction – Key Questions

- What encompasses a successful rehabilitation?
- The Regulator is asking;

"How resilient is the newly rehabilitated area to future disturbance events such as fire, flood or climate change?" and

"At what stage of the rehabilitation process can mine closure proceed?"

 What is a good measure of ecosystem rehabilitation success?

Aim of the Study

develop a meaningful, practical and rigorous system of assessing the success of ecosystem rehabilitation on opencut coal mines in the Bowen Basin



Approach

The key elements required for any rehabilitation are:

- landscape reconstruction or landform design,
- viable root zone establishment, and
- establishment and maintenance of vegetation cover

(after Bell, 1996).



Approach - Similarity

Composition & Structure

Redundancy

Entities

Biomass

Biodiversity

Complementarity

Indicators

Ants, Grasshoppers,
Dung Beetles,
Arthropods, Mammals,
Birds,

Plant Structure and Cover,

Habitat Heterogeneity

IndicatorsSeed Banks,

Impacts of fire, drought and deluge

Time to recovery

Resilience

Elasticity Hysteresis Damping LFA Tric

Trigger Transfer Reserve Pulse **Indicators**

Ecological Processes,
Nutrient Cycling, Soil,
Organic Matter,
Infiltration/Runoff
Landscape Organization

Dynamics

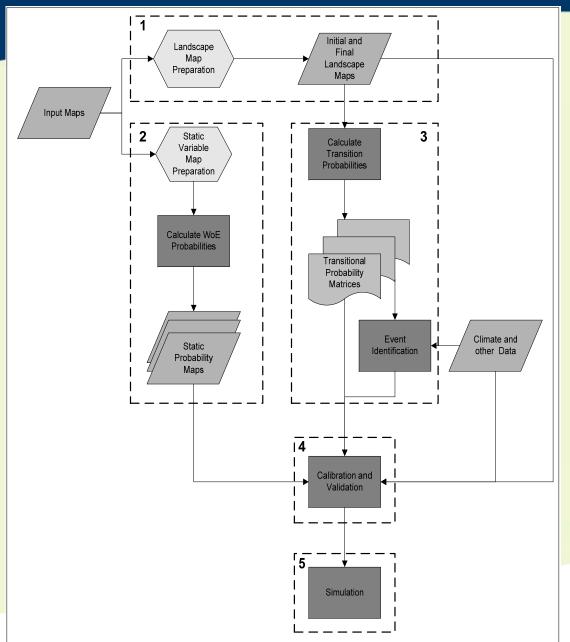
(Temporal changes to structure and function)

Function

(C&S Function Dynamics) = ? Ecological Restoration Performance



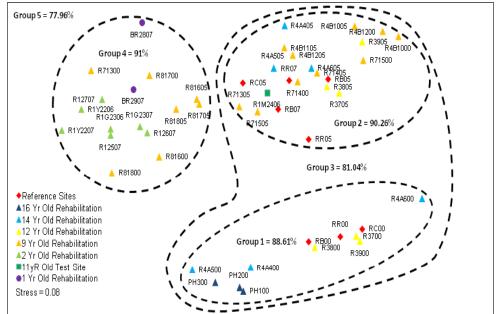
Approach - Simulation

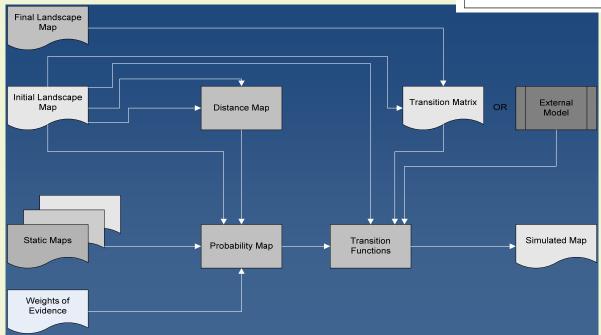




Approach - Summary

Rehab Monitoring
Data Analyses - Similarity





Ecosystem Evolution

Modelling
- Simulation

niversity

Success Rating = f(Similarity & Simulation)

Beneficiaries

- Mine Operators Goals, Monitoring
- Coal Mining Companies Efficiencies, Cost Savings
- Qld DERM Reduced Liability, Monitoring
- Community Stakeholders Usable post mining land

Thank You!

