

SMI **CMLR**

Centre for Mined Land
Rehabilitation



How far have we come? A reflection of rehabilitation research in Queensland over recent decades

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Outline



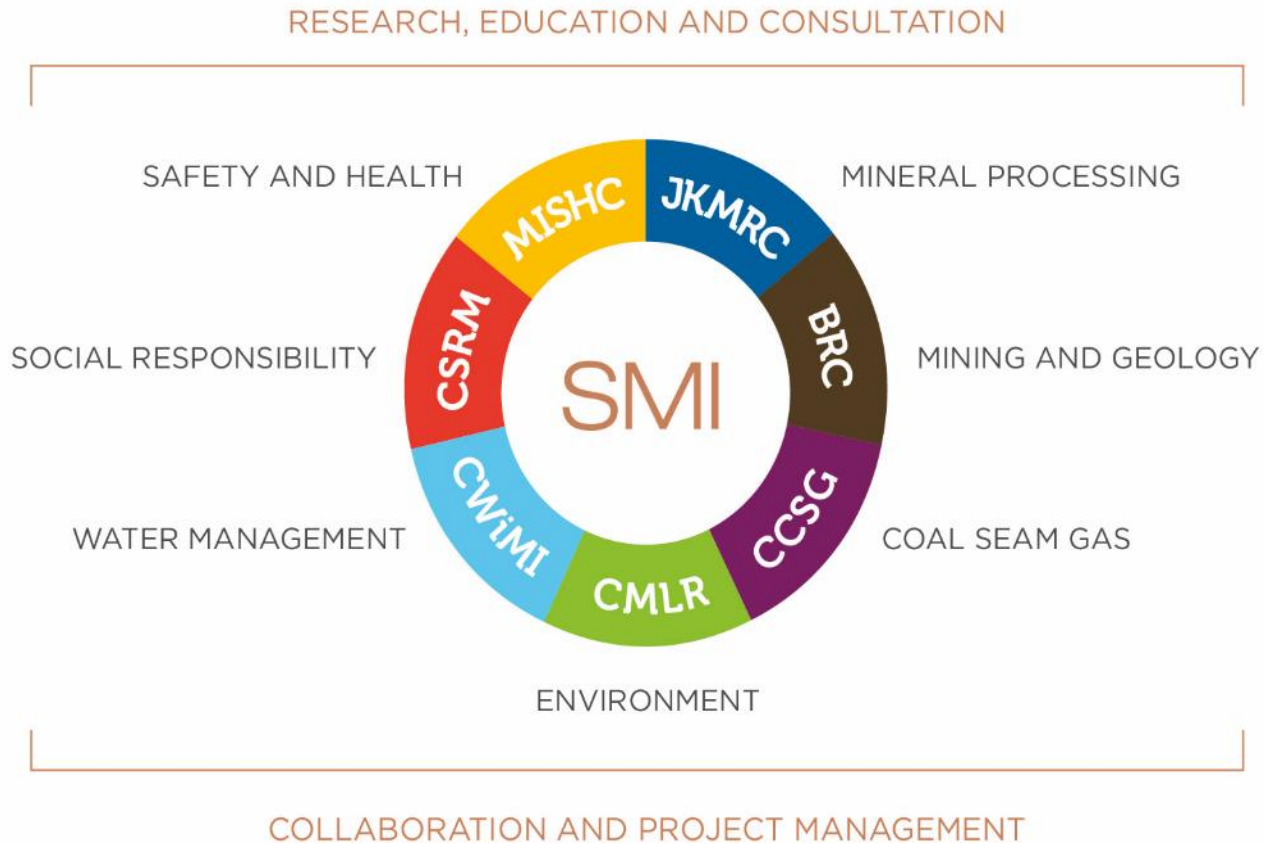
- The research environment
- Topsoil management and sustainable ecosystems
- Surface stability and end use options
- The Kidston experience
- The Stradbroke story
- The challenges of processing streams
- The developing and the future
- Conclusions



The University of Queensland



The Sustainable Minerals Institute (SMI)



Centre for Mined Land Rehabilitation

- **Stable Landforms and Sustainable Substrates**
- **Water and Contaminants in the Landscape**
- **Ecosystem Structure and Function**
- **Monitoring and Mapping Technologies**
- **Mine Closure and End Use Planning**

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Promoting sustainable
outcomes through
environmental research





TOPSOIL MANAGEMENT AND BUILDING SUSTAINABLE ECOSYSTEMS





Valuing the topsoil and its profile



Valuing the value of long-term trials



Learning and understanding what works and why



Building in resilience to the inevitable next disturbance

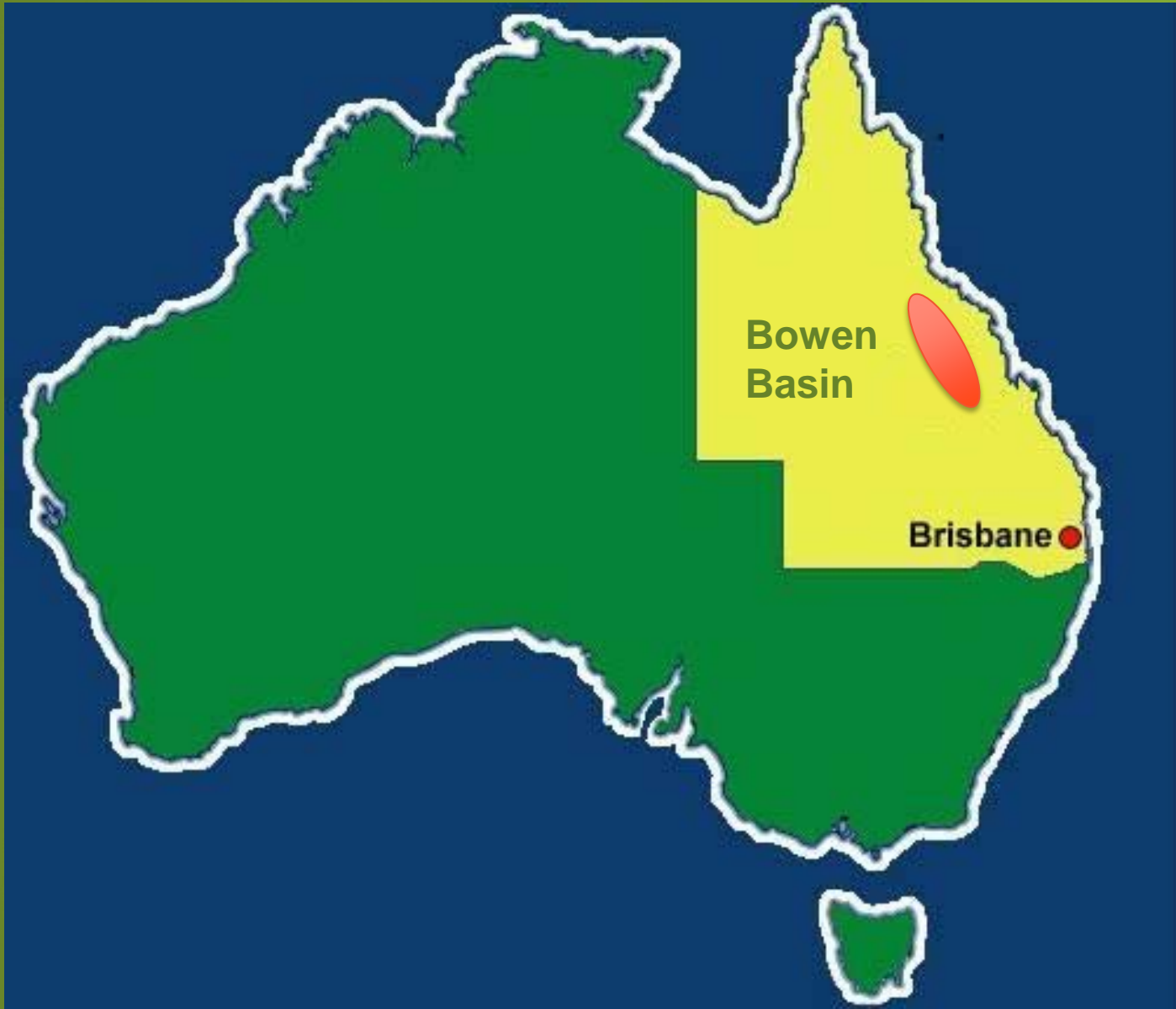


New landform means a new hydrology, ... means a new ecology?



SURFACE STABILITY and END USE OPTIONS





The starting position of the rehabilitation challenge



Optimising landform based on material properties & climate



Addressing the competition for an improved outcome



Good cover but are there hidden risks?

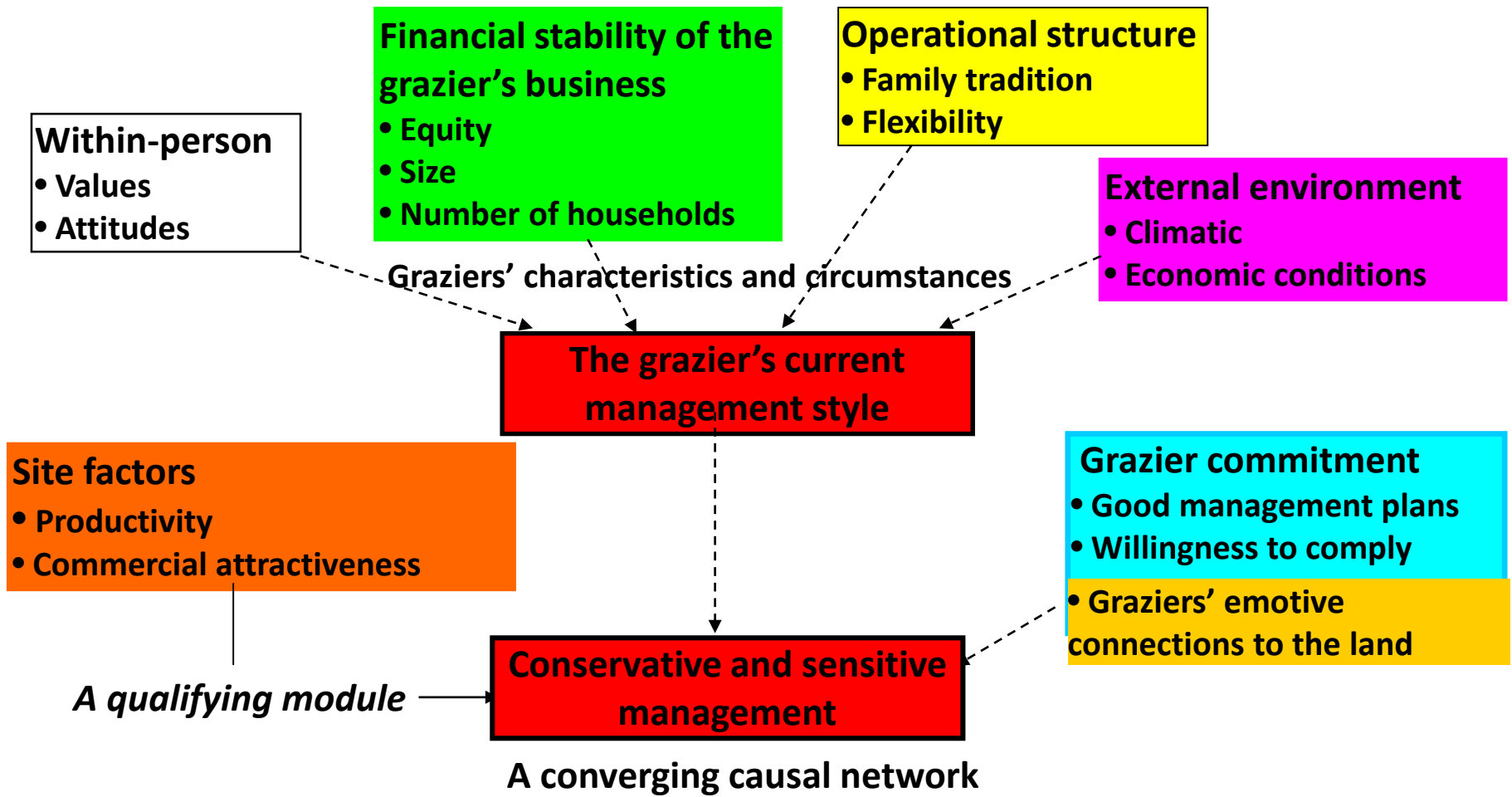


Good look, ... but is the risk of mismanagement acceptable



Some social profiling to better understand an end-use risk

Modelling approach – Conditional probabilities – A Bayesian Belief Network



It about more than 'the gums and wattles'



.. and its about far more than the vegetation alone





THE KIDSTON EXPERIENCE





Industry challenging the rock dump slope guideline



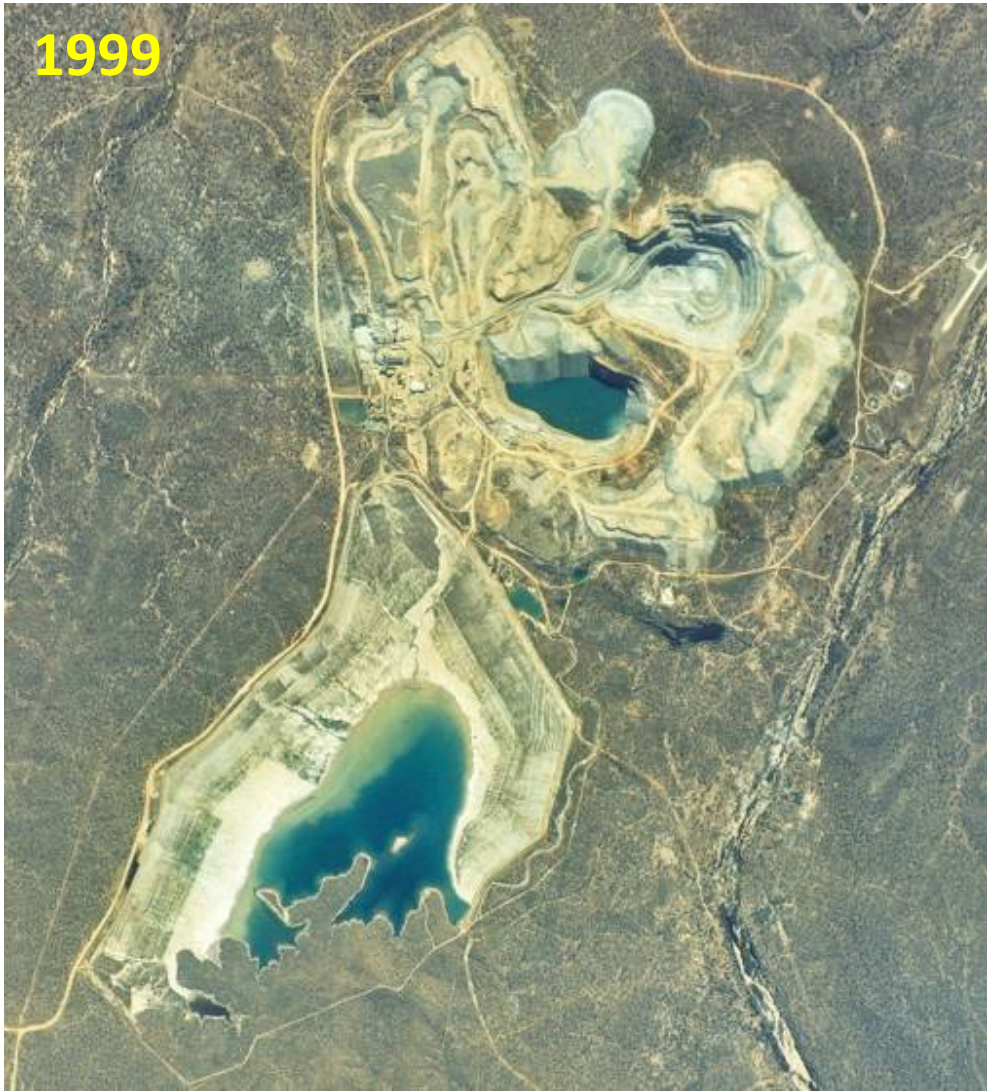
... and the required depth of cover on tailings



So far, so good



The temporal view from above





THE STRADBROKE STORY





High visual impact in the giant podsols



Soil returned to the tails reshaped to original contours



Soil biology and soil formation processes getting restarted



Successfully reconstructing sustainable ecosystems





THE PHYSICAL AND CHEMICAL CHALLENGES OF PROCESSING STREAMS





Building plant communities in alumina refinery residues



A valuable trial lost for another value

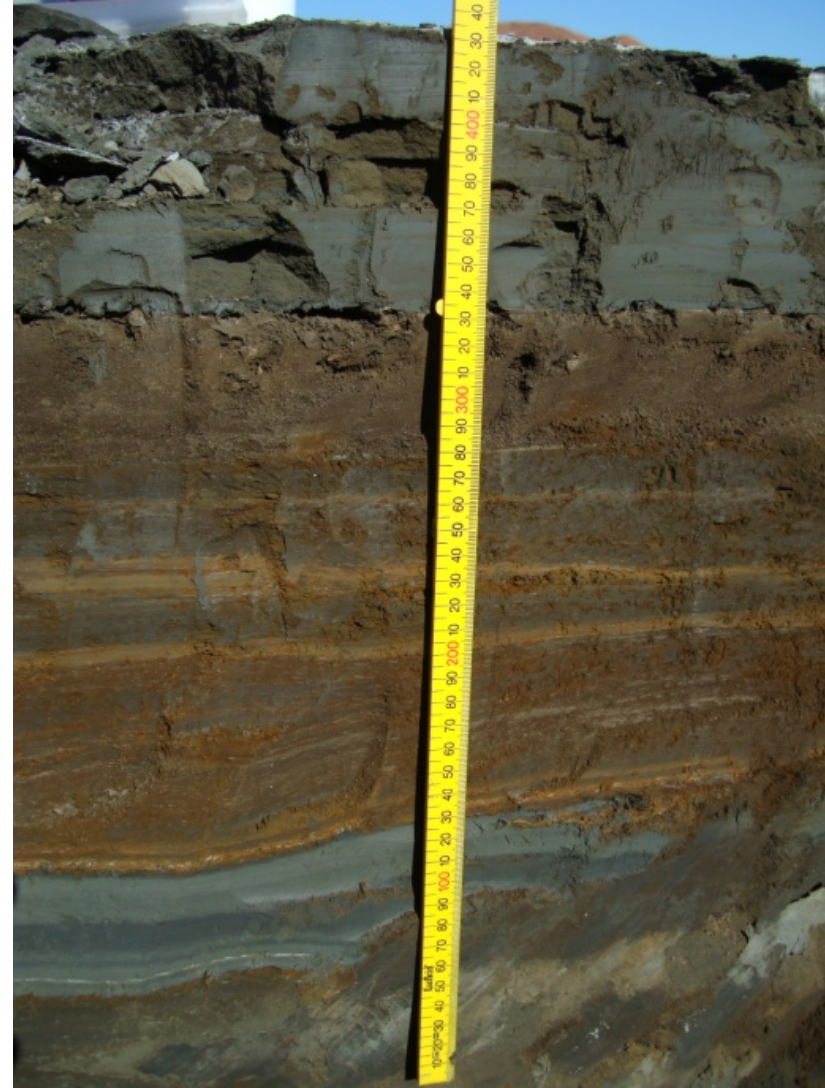




Base metal tailings – the ecologist's blank canvas



Close to town (left), Close to 3D chaos (right)

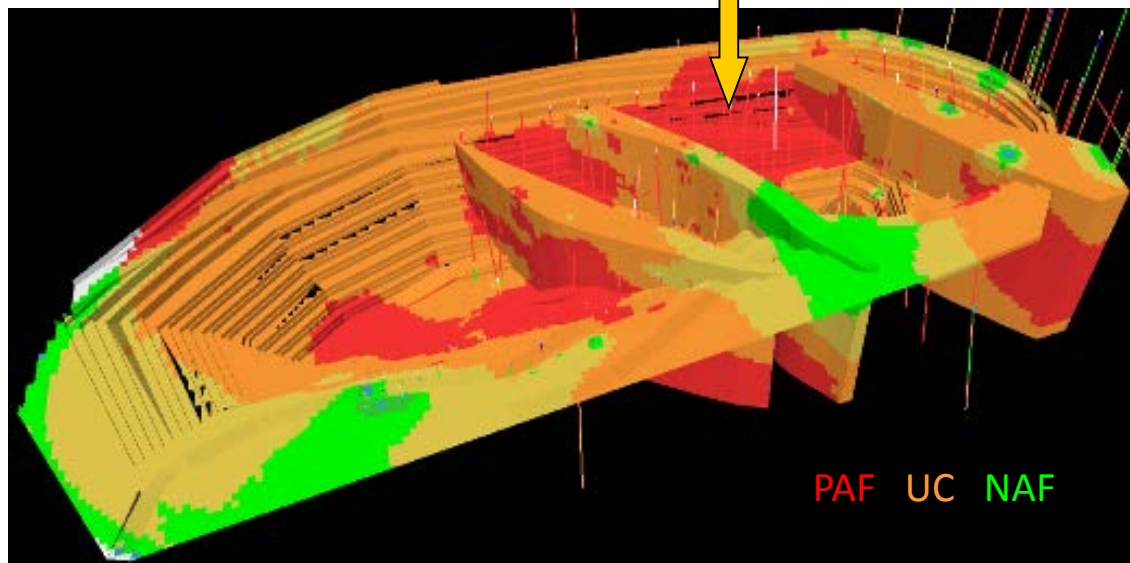
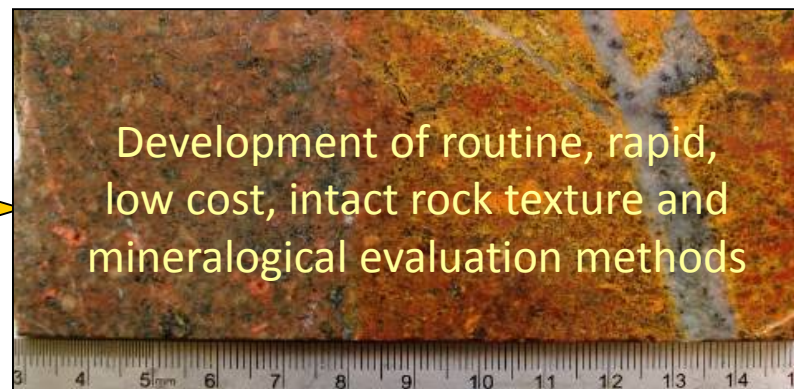




THE DEVELOPING AND THE FUTURE



Building environmental attributes in the block model



The seepage challenge – predicting its end or its perpetuity



Co-existence - the conflict has moved down under



Moving monitoring to new levels



Metals in the environment – risks and opportunities



Metallophytes – Ni hyperaccumulators as an opportunity?



Designer tailings – integrating the disciplines



We know how to prevent this, but ... do we listen and learn?



Perhaps we need to manage the knowledge better?



Conclusions

- A wealth of research has been supported over the years
- Have we learnt from the past and put findings into practice?
- Can we use that research knowledge better? What are the barriers?
- There is more awareness of the critical importance of planning
- Is there the integration of disciplines and commitment to maximise opportunities and reduce the risks of negative legacies?
- Societal expectations and increasing constraints on access to land, water and energy will continue to be drivers of change and opportunity



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Thank you

