Rum Jungle

Investigation of Future Rehabilitation Requirements

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Format of presentation

- Describe the site and previous rehabilitation undertaken
- Scoping process that we have been working though
- How we have involved our Stakeholders
- Development of potential rehabilitation scenarios

Mining – 1954 to 1971

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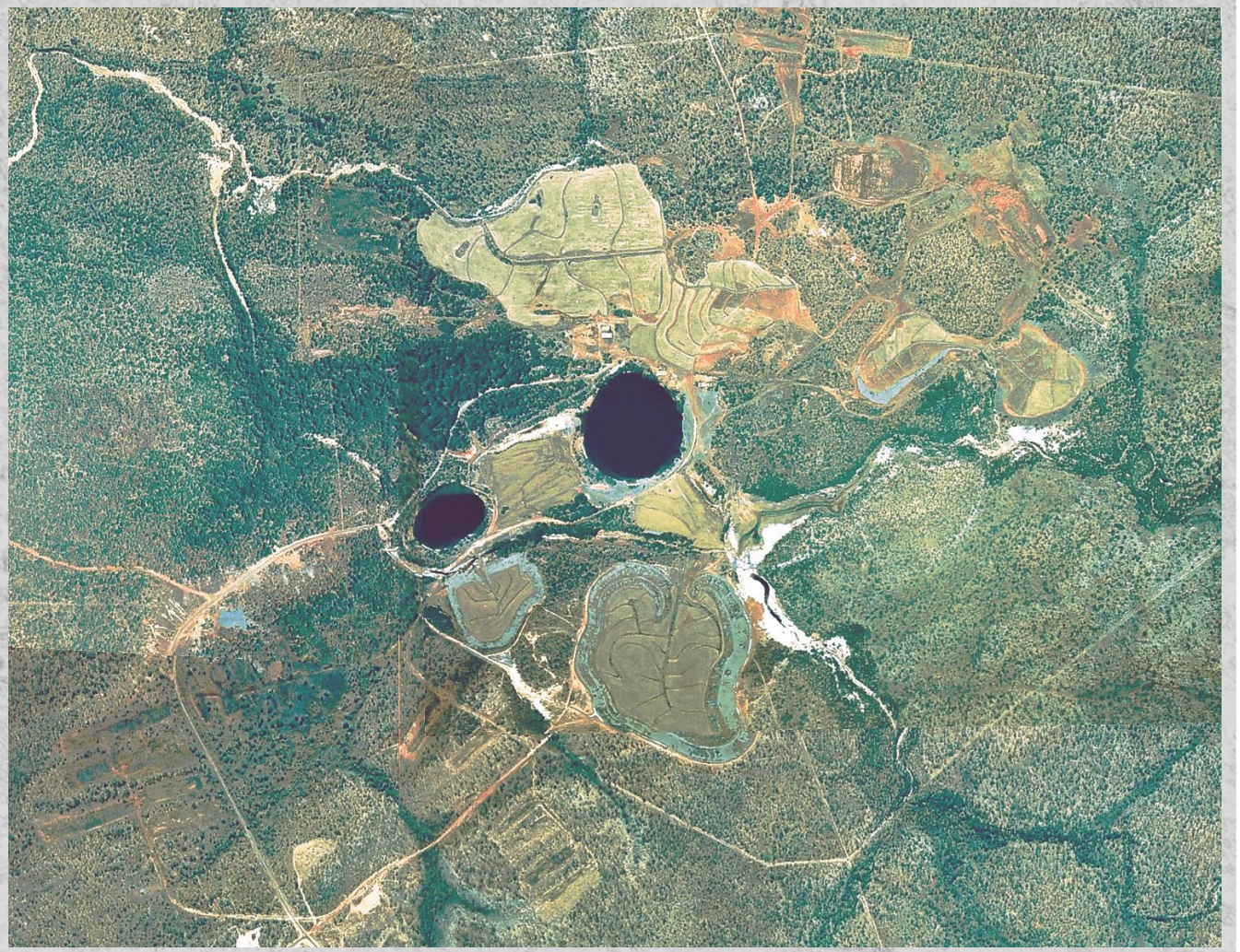
- Most mining completed by 1963
- 3,530 tonnes of U_3O_8 produced
- 20,222 tonnes of Copper concentrate produced
- Processed stockpiled ore until shutdown in 1971

Post mining - 1971 to 1983

- Processing plant auctioned off in 1971
- Environmental studies finalised in 1975
- 1977 processing plant site was backfilled & initial clean-up of the site (primarily aesthetic)
- Significant AMD impacts identified downstream
- 1982 agreement signed between the Commonwealth and NT which established the Rum Jungle Rehabilitation Project
- 1983 rehabilitation works commenced

Rehabilitation – 1983 to 1986

- Reclaimed tailings & heap leach material
- Reshaped and covered WRD's
- Treated water in the flooded pits



Rehabilitation – 1983 to 1986

- Achieve a major reduction in surface water pollution by reducing average annual load of:
  - Cu by 70%
  - Zn by 70%
  - Mn by 56%
- Reduced public health hazards, including radiation levels
- Reduced levels of contaminants in the flooded pits
- Implement aesthetic improvements including revegetation

The Site 2013

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- Post Rehabilitation
  - Water quality in the East Branch of the Finniss River improved
  - Does not meet current leading practice standards for mine closure
- Continuing impacts from Acid and metalliferous drainage (AMD)

Traditional Aboriginal Owners

- Site is the subject of a successful land claim
- Two clans recognised as having traditional ownership over the site (Kungarakan and Warai)
- Have a strong cultural connection to the site
- Have been historically excluded

National Partnership Agreement

- Agreement between the Commonwealth and NT government on the future management of Rum Jungle
- The objectives were to:
  - Improve site maintenance and environmental monitoring activities
  - Develop an improved rehabilitation strategy for the site consistent with the views and interests of stakeholders particularly the traditional owners

Understanding the current state of the environment

- Needed to understand the sources of contaminants and how they are transported
- Started by reviewing all of the historic information
- Identified knowledge gaps
- Commenced new investigations

Investigations completed

- Have included:
  - Groundwater modelling
  - Seepage load balance
  - Waste rock characterisation
  - Site contamination survey
  - OH&S risk assessment
  - Heritage survey
  - Weeds survey

Investigations completed

- Conceptual cover design and survey of suitable construction materials
- ANZECC assessment of the Environmental Values in the downstream environment
- Mine model
- Water balance
- Environmental monitoring

Groundwater

- Groundwater was poorly characterised
  - 103 historic monitoring bores
  - Shallow, inadequate distribution
- Additional bores installed since 2010
  - 27 new bores complemented existing network
  - Groundwater levels and quality conditions are routinely monitored

Groundwater

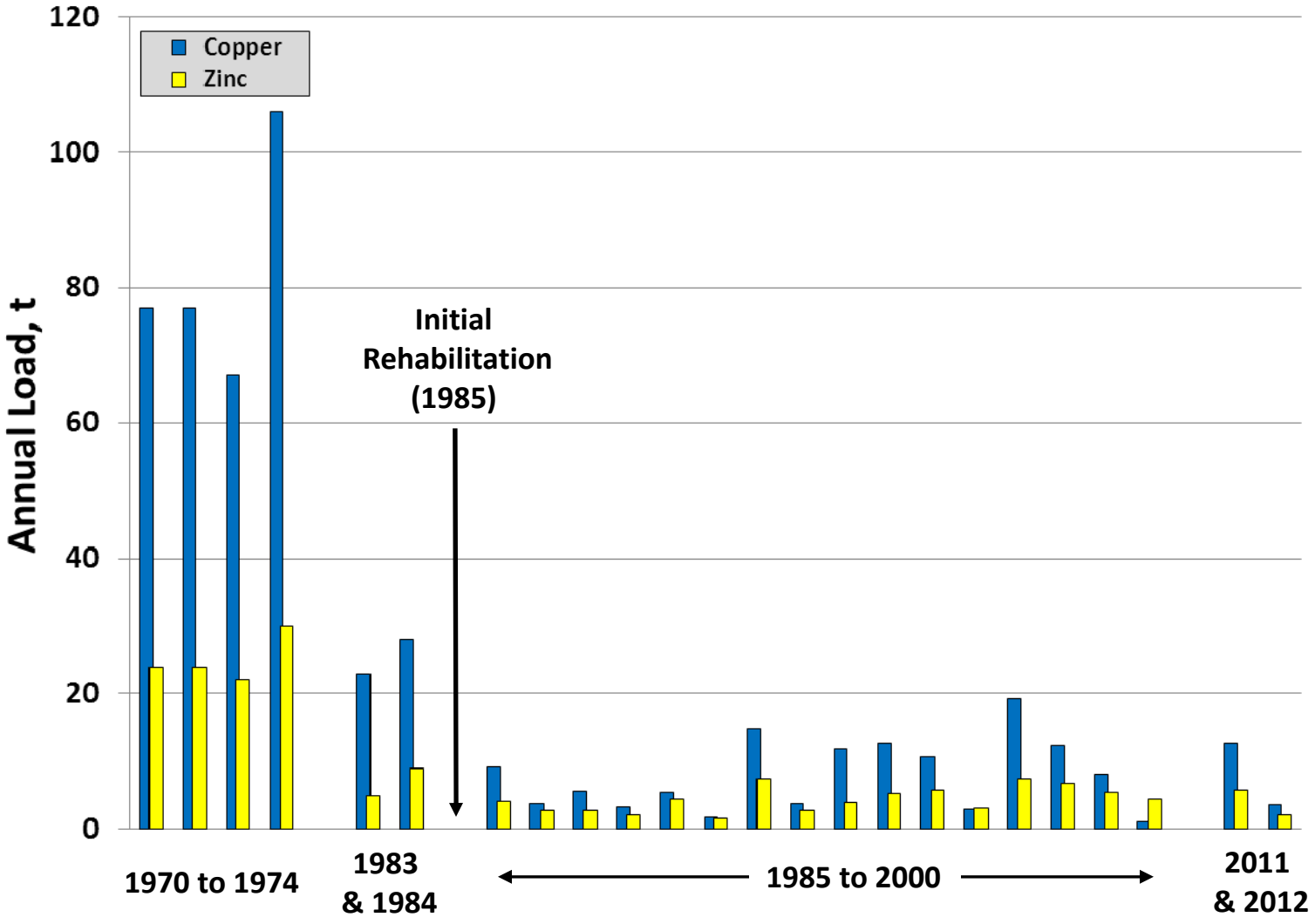
- WRDs and Dysons backfilled pit are the major sources of contaminants to groundwater and to the East Branch of the Finniss River

- Groundwater contamination is relatively shallow and localised

Seepage load

- Analysed data monitoring data on and downstream of the site
- Annual load of SO4 in the East Branch for 2010/2011 was about 3,400 tonnes
- Annual loads of dissolved metals range from 5 tonnes for Cu & Ni to 24 tonnes for Mn

Seepage loads in the East Branch of the Finniss River



Waste rock characterisation

- Investigated the geochemical properties of the waste in the WRDs
- Samples were collected using both excavators and a sonic coring drill
- Analysed to determine acid neutralising capacity, net acid generation potential, mineralogy, elemental composition and leachable metals

Waste rock characterisation

- Majority of waste sampled had an acidic pH and high EC
- Neutralising potential of the waste was low
- Results of water leach extractions identified a number of leachable metals that exceed ANZECC

Waste rock characterisation

- With the exception of Dyson's, all WRD's contain substantial residual sulfides
- Have the potential to continue to oxidise and generate acidic and metaliferous drainage
- These results have helped create a priority order for management of the waste based on acid generating potential and leachable metals

Water quality objectives

- Developed using the methodology identified in the ANZECC water quality guidelines
  - By identifying the current and potential future environmental values
    - Through site inspections and discussions with stakeholders
  - Can then identify water quality trigger values

Water quality objectives

- Set the benchmark for the extent of improvement in water quality that must be achieved
- Further work is currently being undertaken to set locally derived water quality trigger values

Stakeholder Involvement

- Needed to build a relationship
  - Meet on a regular basis
  - Provided all of our technical information as it became available
  - Included traditional owners in project wherever possible
- Worked with them to identify their objectives

Stakeholder involvement

- Web-GIS
  - Accessible by the public from

    www. rumjungle.nt.gov.au
- Historic and current aerial imagery, cadastre, photos, contours, data from investigations commissioned (e.g. waste rock characterisation, soil contamination)
- Conceptual rehabilitation plan

Developing future options

- Started to understand the site based on the findings of the technical investigations
- Thinking about what the traditional owners might want to do with the site
- Drawing on the experience of experts working on the project
- Created the environment we needed to look at potential rehabilitation scenarios

In Summary

- Make sure that you have the time and resources to understand what it going on
- Include your stakeholders
- Make sure that you have the right people
- Plan for success

Acknowledgements

- Rum Jungle Project Team
- Technical experts
- Traditional owners

www.rumjungle.nt.gov.au