

Current Groundwater Quality Conditions at the historic Rum Jungle mine site, Northern Territory (Australia)

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Department of Resources - Minerals and Energy

Objectives/Overview

1. The Rum Jungle mine site is highly-impacted by acid rock drainage (ARD) and several attempts have been made at rehabilitation
2. Fish & other wildlife in the East Finniss River have been wiped out by toxic levels of dissolved metals
3. NT Department of Resources has been tasked with developing a new rehabilitation plan & RGC has been retained to assist

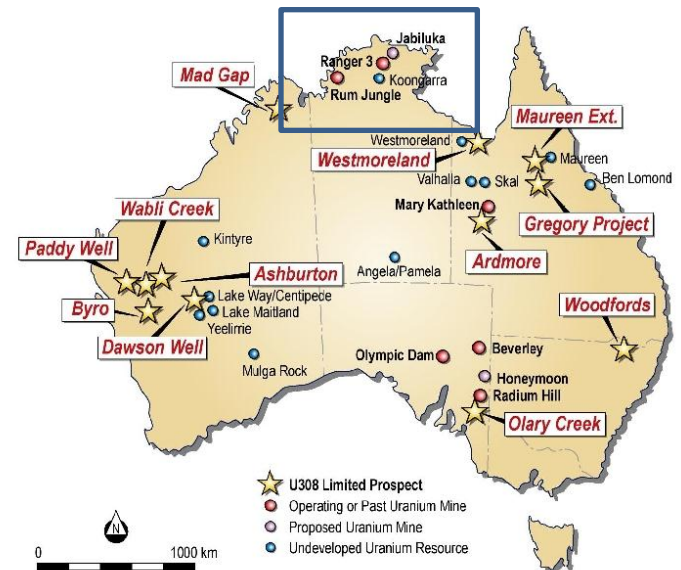
The purpose of this presentation is to:

- Briefly describe the history of mining & rehabilitation at the site
- Describe current conditions & work completed to date
- Outline the timeline for future rehabilitation

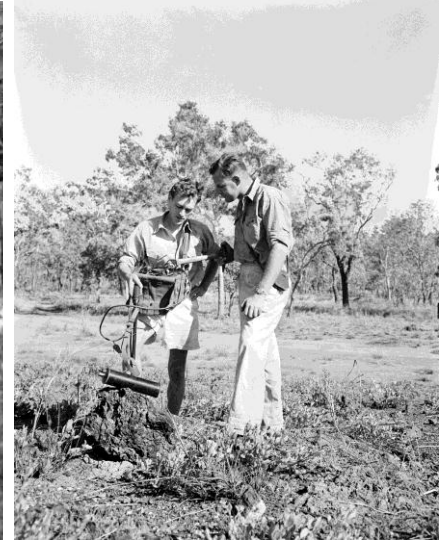
Rum Jungle mine site, Northern Australia



85 km south of Darwin
in the Rum Jungle Mineral Field



Discovered in 1949 by local farmer



Mining began in 1953



White's, Intermediate, & Dyson's ore bodies were ultimately mined out (Dyson's solely for uranium, the other two for a suite of metals)

Mining ceased in late 1960s

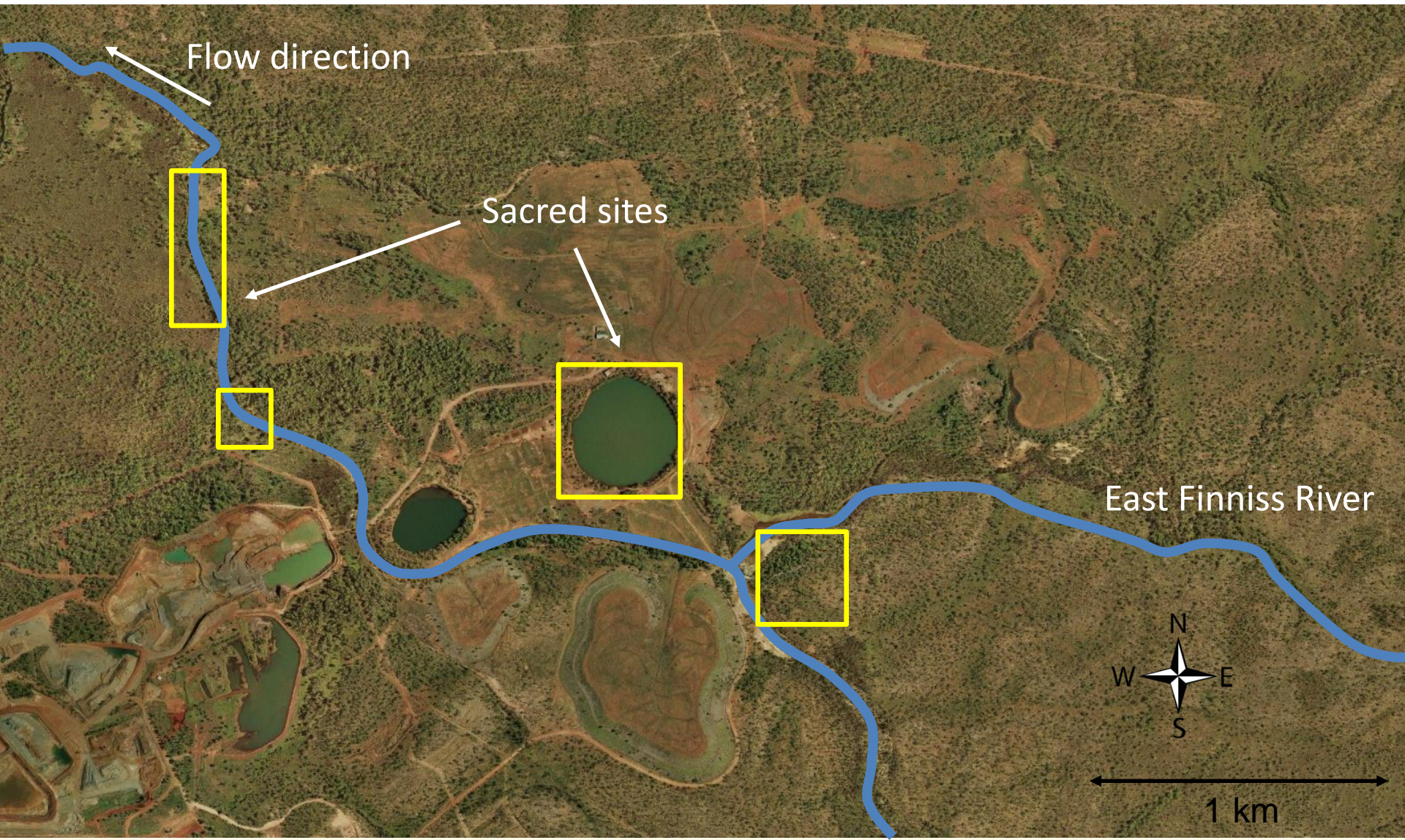


History of mining & rehabilitation

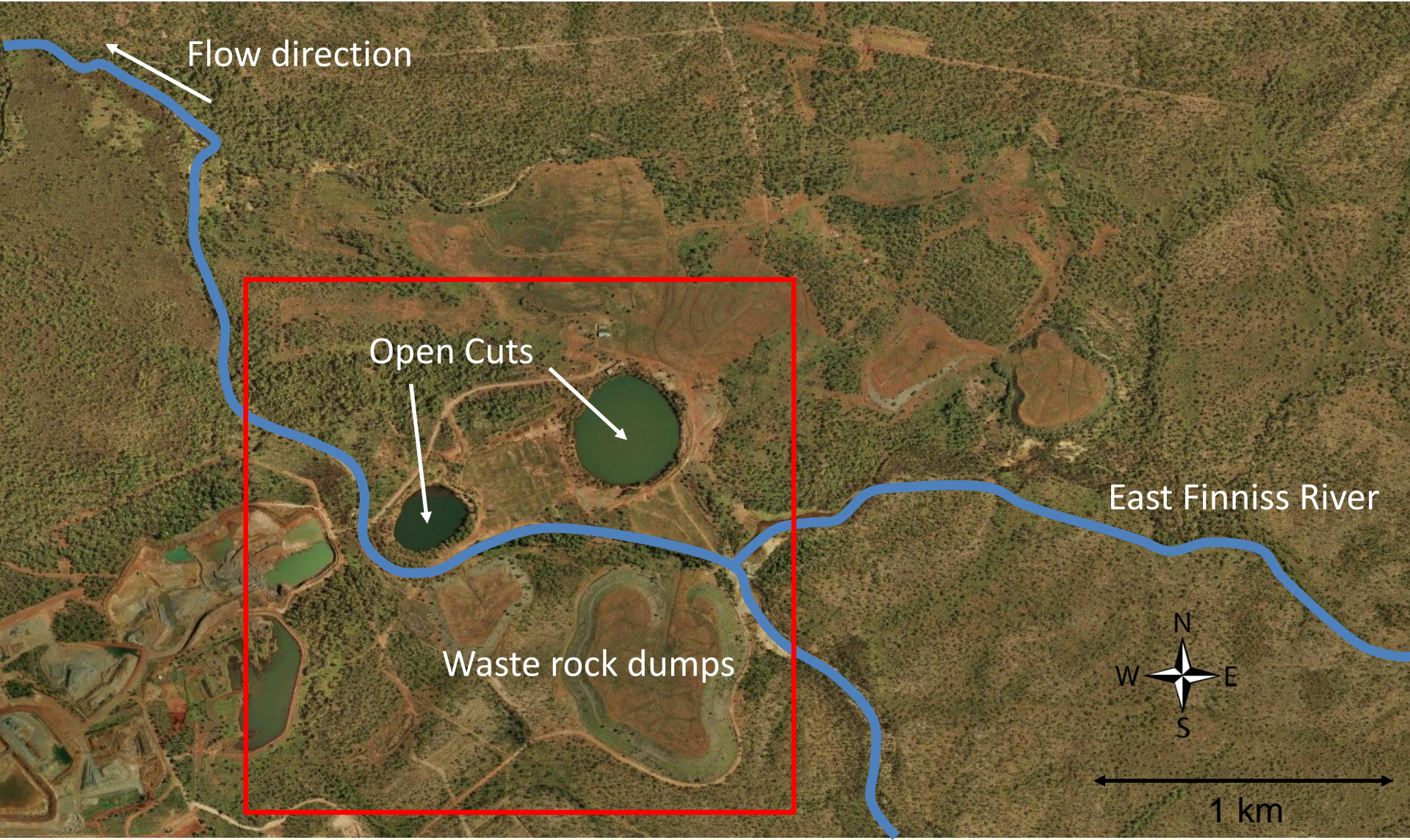
- 1949: Discovery of uranium at Rum Jungle
- 1953 to 1969: Active mining
- 1969: Mining operations cease (& the site is abandoned)
- 1977: Initial rehabilitation attempts are made (prove unsuccessful)
- 1983: Rum Jungle Rehabilitation Project initiated (\$16.2M AUS)
- 1984/1985: Rehabilitation completed
- Pumping & treating water from the flooded pits
 - Re-shaping & covering the waste rock piles
 - Backfilling one of the open pits with tailings & waste rock
- 1985 to 2009: Water quality conditions deteriorate due to ARD
- 2010: Decision made to rehabilitate (again) & site investigation initiated
-
- 2013: New rehabilitation plan to be implemented**

Site Layout

East Finnis River & Aboriginal Sacred Sites



Central mine area



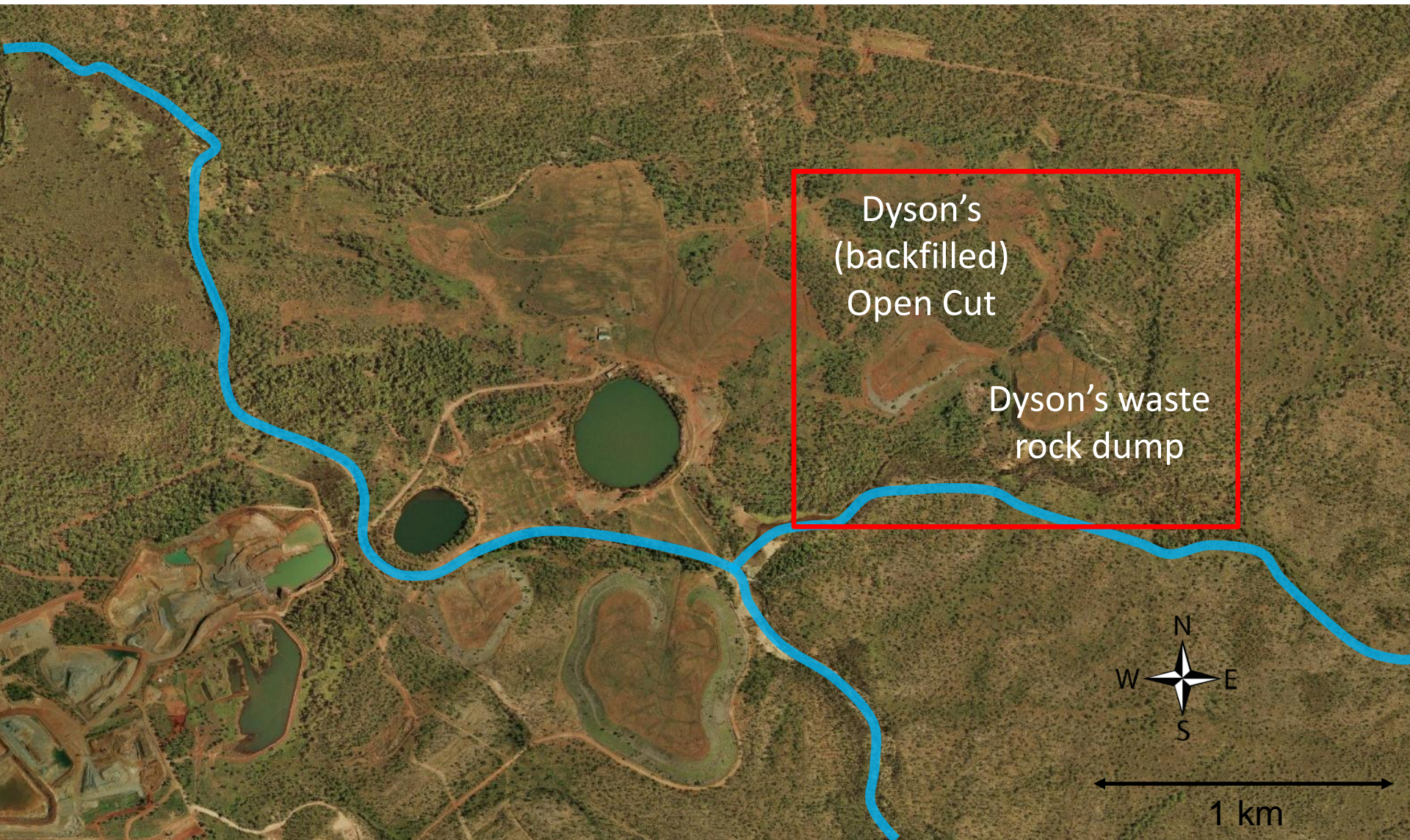
Central mine area

White's Open Cut & waste rock pile

Intermediate Open Cut & waste rock pile

Brown's Oxide pit (proposed)

Dyson's Area



Dyson's Area



Dyson's (backfilled) Open Cut



Dyson's waste rock pile

Current Conditions

Seepage loads to surface water



Seepage loads to surface water



Annual loads
(t/yr)

2,500 SO₄

11 Cu

56 Fe

8 Zn

+ 20 to 25%
from Dyson's
& Open Cuts

Groundwater quality conditions poorly-characterized

103 historic monitoring wells & 27 new wells installed in 2010



Routine monitoring

Bi-monthly surveys of groundwater levels & quarterly water quality sampling

2010/2011 Wet Season ✓

2011/2012 Wet Season ✗

2012/2013 Wet Season ✗

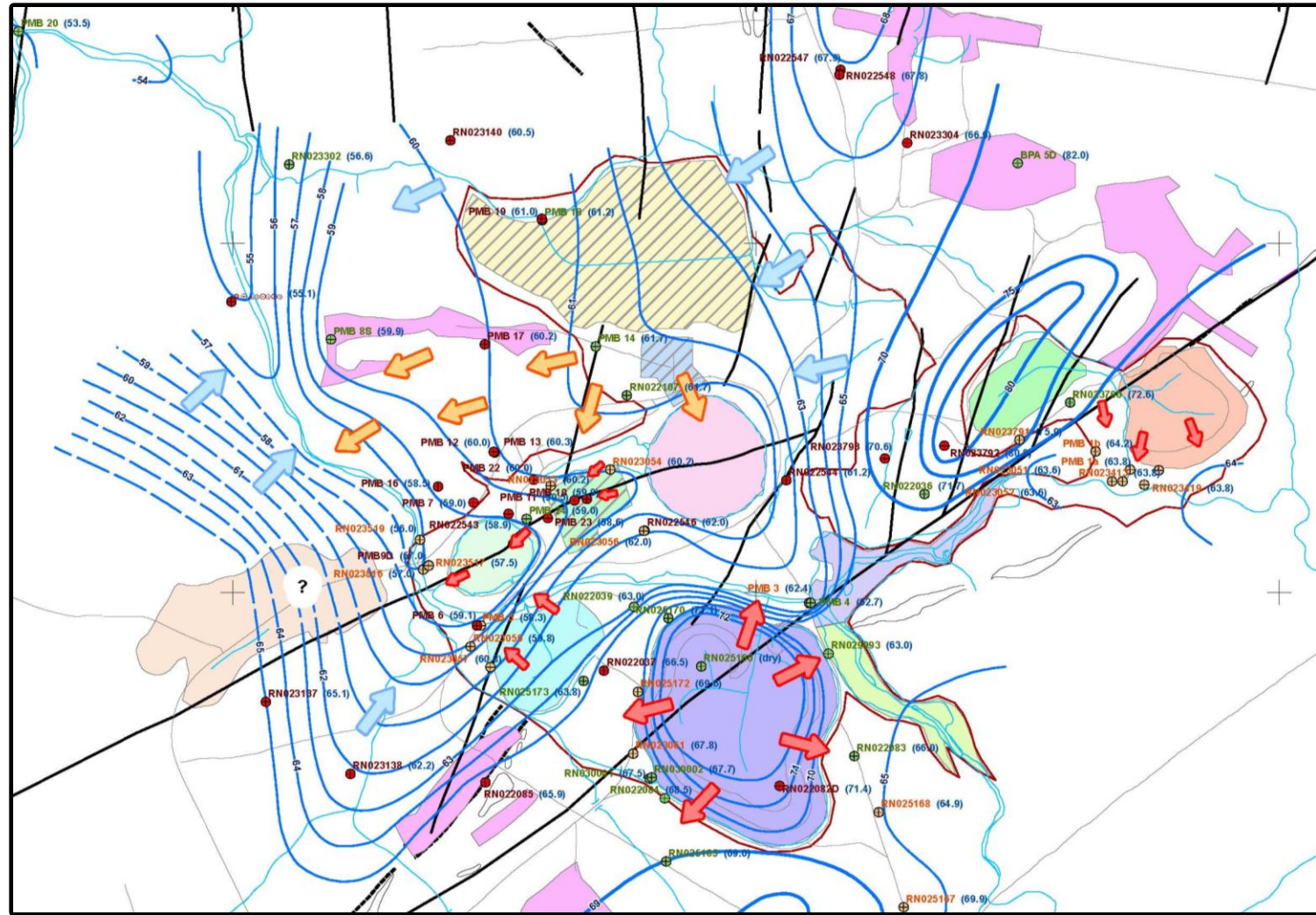


OBJECTIVES:

1. Establish baseline conditions prior to further rehabilitation
2. Develop a groundwater flow model
3. Assess contaminant loads to East Finniss River via groundwater

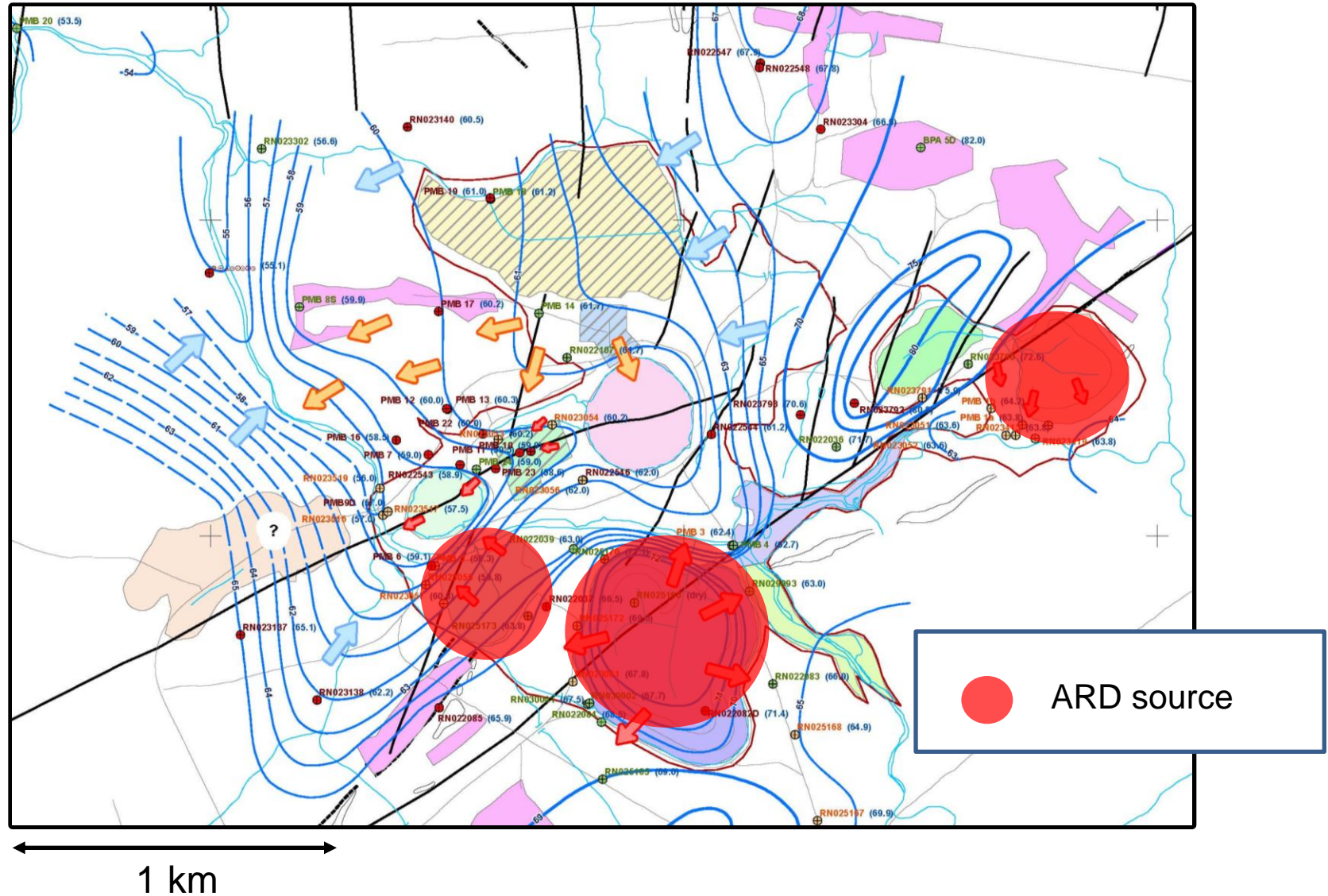


Contaminant transport in groundwater

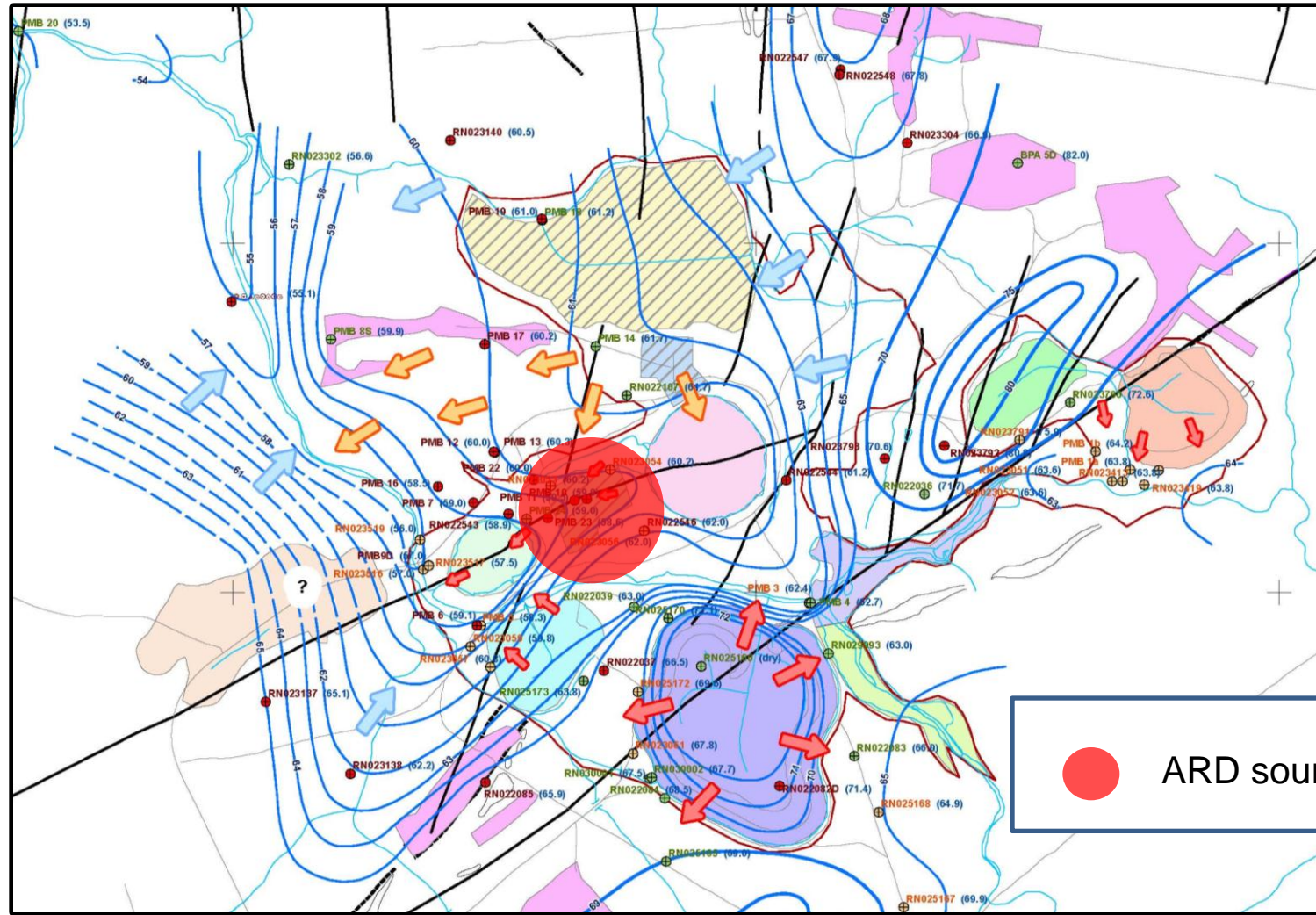


1 km

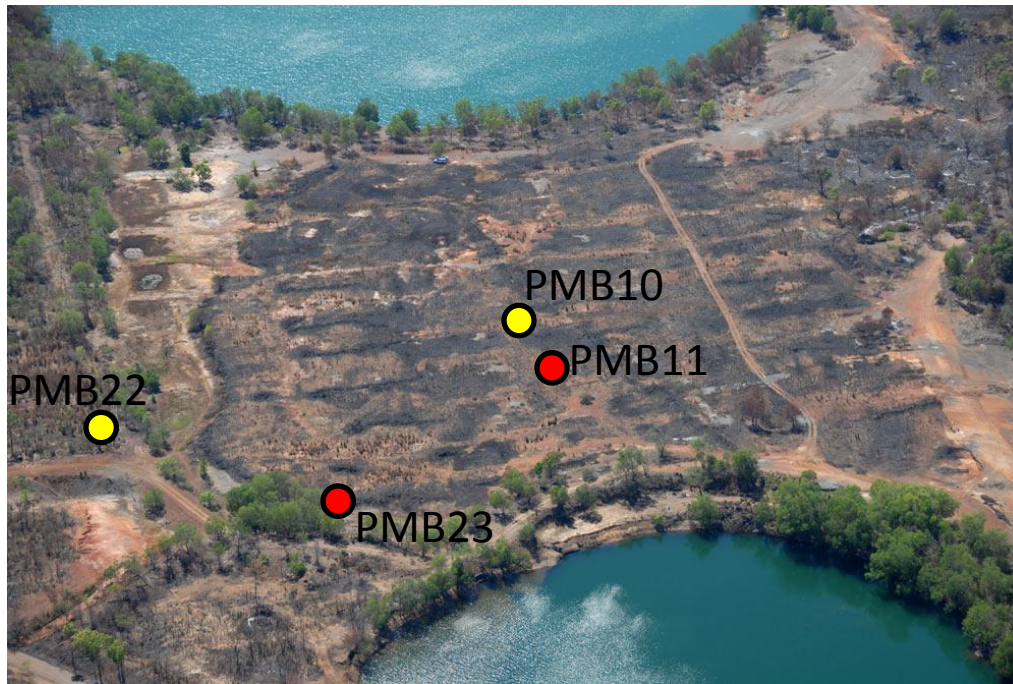
Receiving groundwater near waste rock piles



Groundwater beneath the former heap leach area



Groundwater beneath the former heap leach area

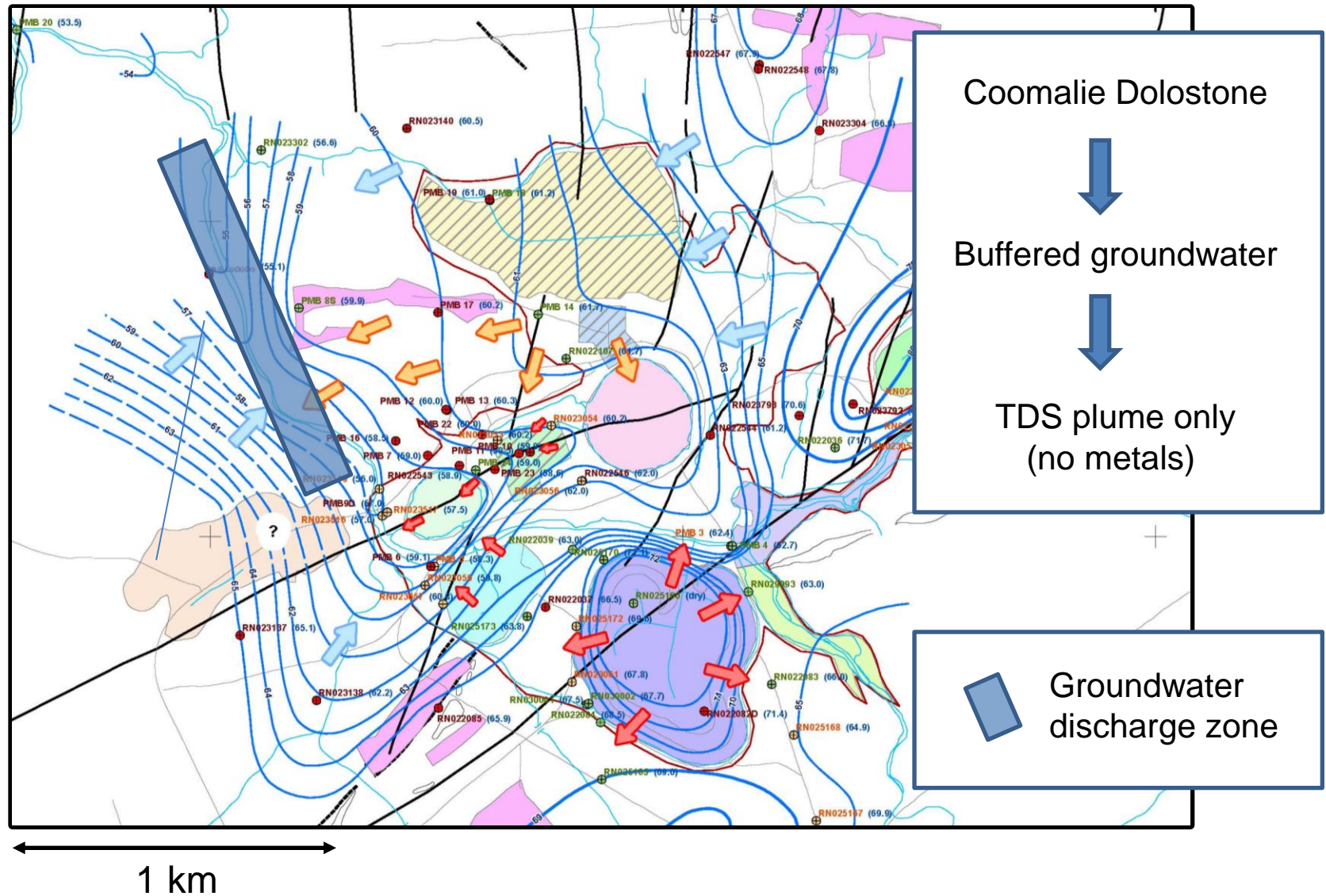


- Relatively unimpacted by ARD
- Highly-acidic, metals-laden water (residual seepage from heap leach)

Samples from December 2010

Well	pH	SO ₄ , mg/L	Al, mg/L	Cu, mg/L	Co, mg/L	Ni, mg/L	Zn, mg/L
PMB11	5.0	5,600	1	137	76	51	9
PMB23	3.5	5,340	38	506	74	56	11

Groundwater discharge to East Finniss River




Concluding remarks

Initial rehabilitation attempts at Rum Jungle have proven inadequate & hence water quality conditions have deteriorated over the last 25 years

A comprehensive site investigation of groundwater & surface water quality is underway to characterize current conditions at the site

This investigation will enable the development of a new rehabilitation plan that will be implemented in mid-2013



Acknowledgements
Staff at the NT Department of Resources
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