

# City to Desert: Mapping and Exploration in Australia, 1994-2012

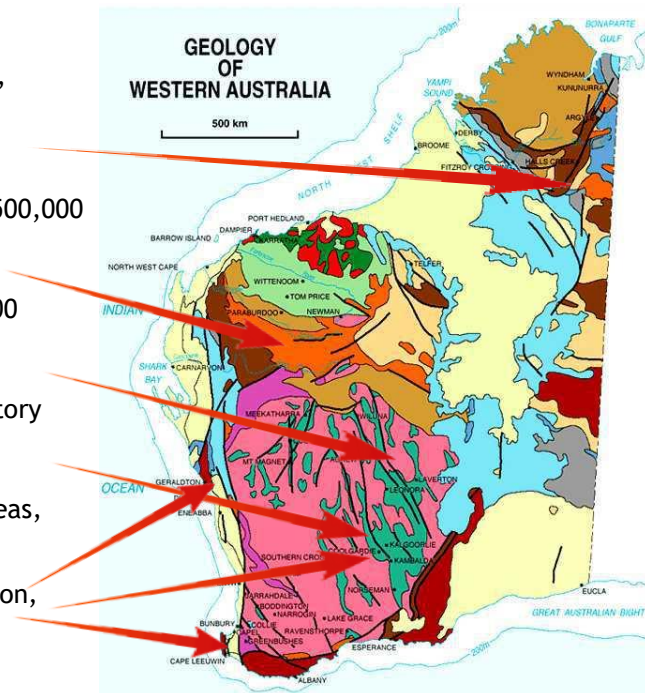


Dr Richard L Langford FGS CGeol



## GSWA Regional, Mineral and Regolith Mapping

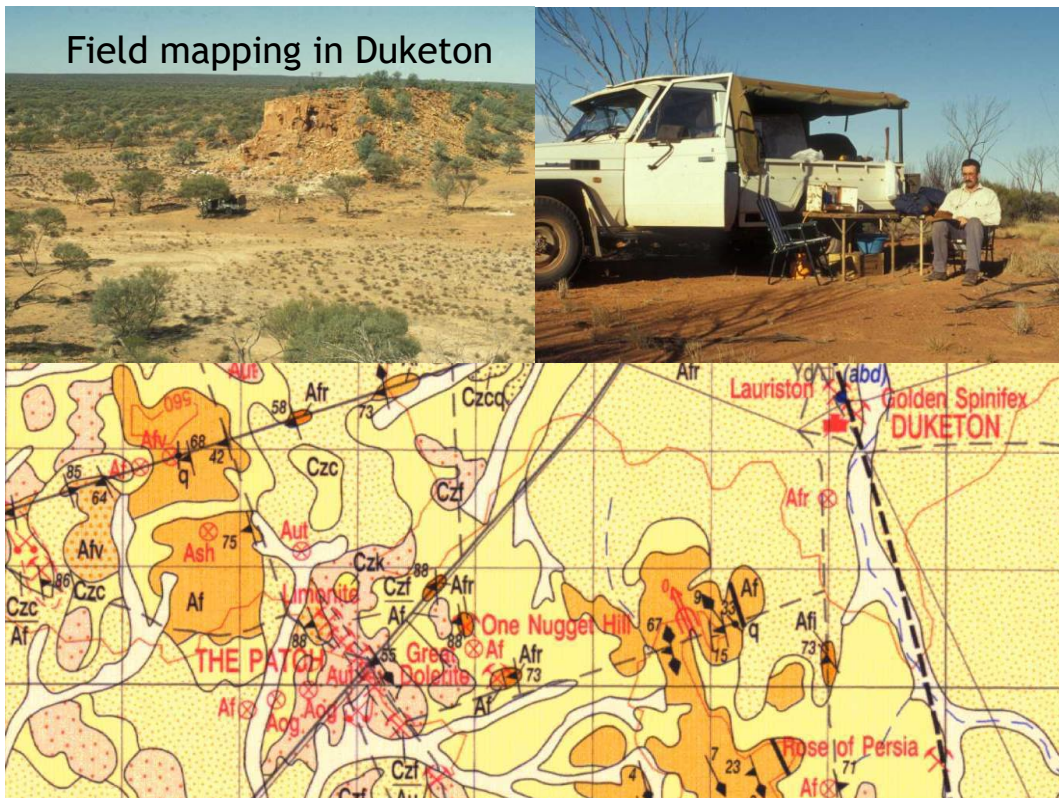
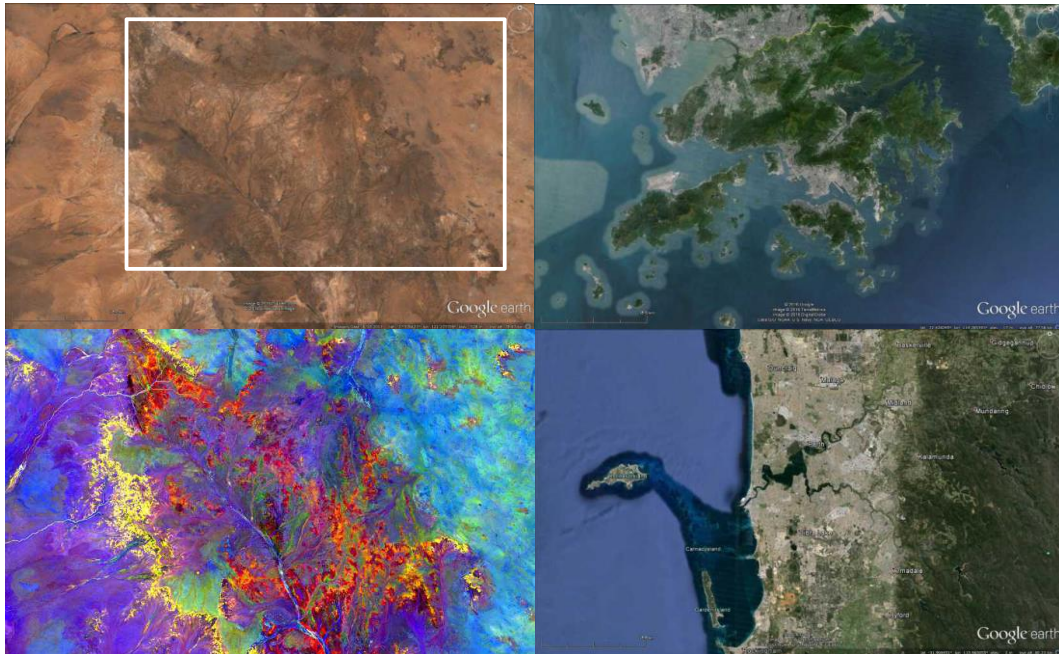
- Regolith-landform mapping, 1:100,000
  - Tanami Desert
- Mineralisation mapping, 1:500,000
  - Bangemall Basin
- Regional mapping, 1:100,000
  - Duketon, Wiluna
- Abandoned Minesites Inventory
  - Kalgoorlie, Westonia
- Urban and Development Areas, 1:50,000
  - Margaret River, Geraldton, Kalgoorlie



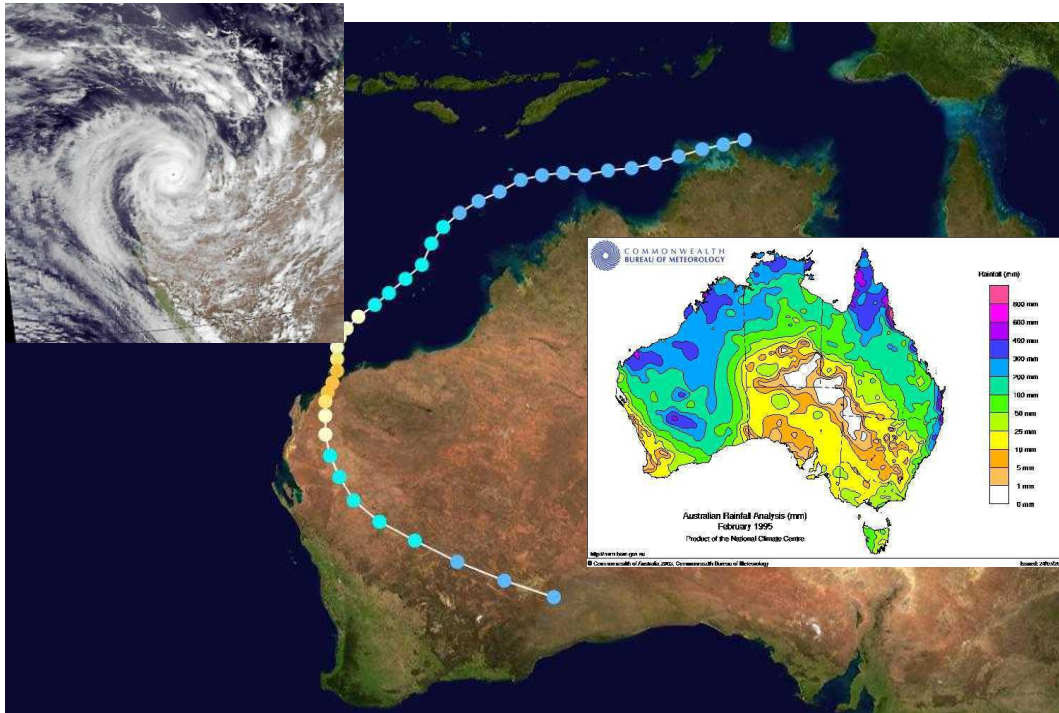
WA Archaean Goldfields: First experience,  
February 1994, 1000km from Perth... and still flat!



# 1:100,000 Sheet Mapping, Duketon 800km north-east of Perth



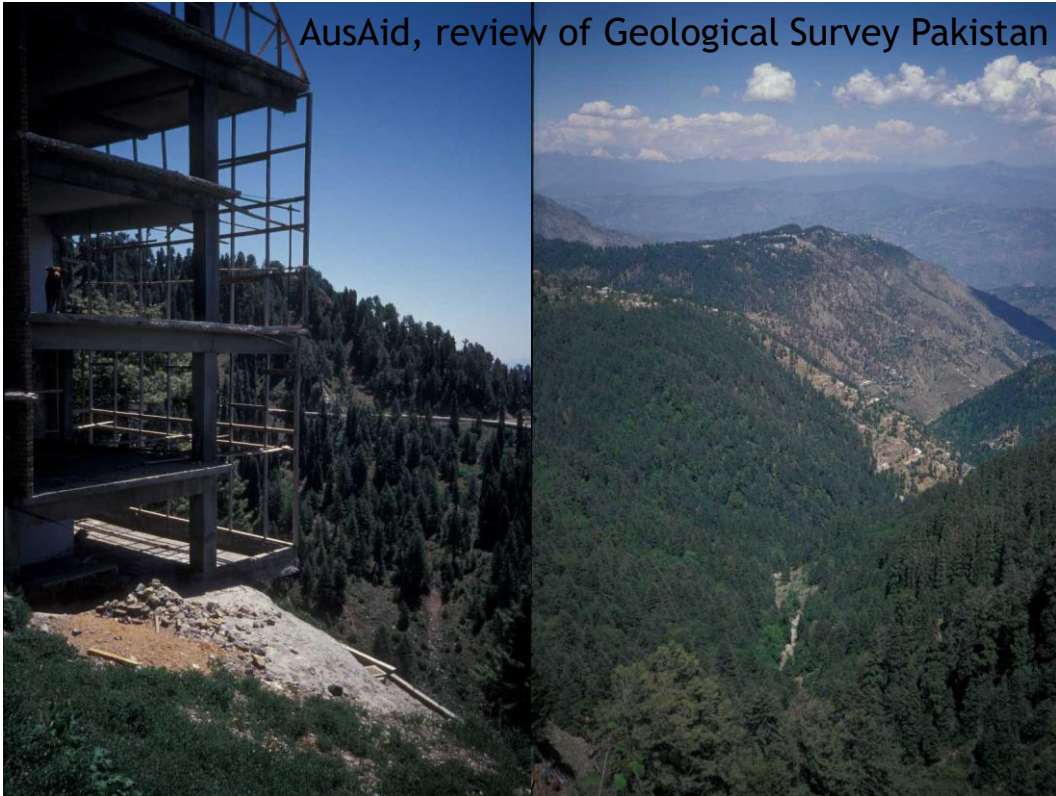
## 1995 - Cyclone Bobby, Pakistan and mapping Wiluna



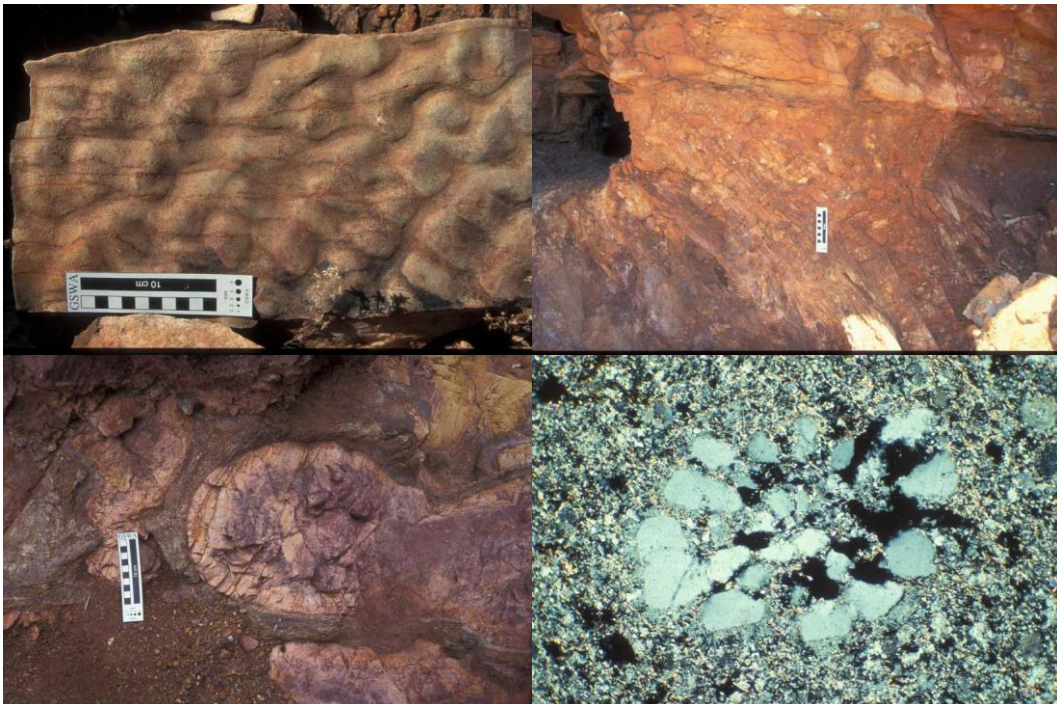
## February 1995, Cyclone Bobby



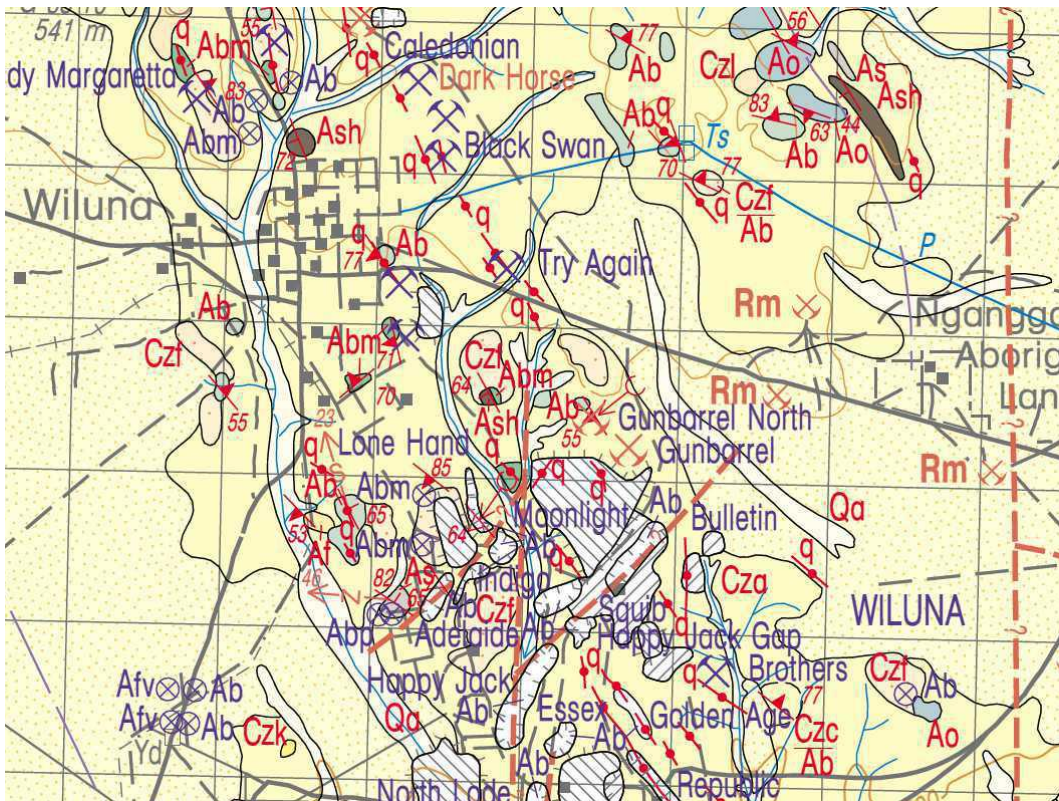
AusAid, review of Geological Survey Pakistan



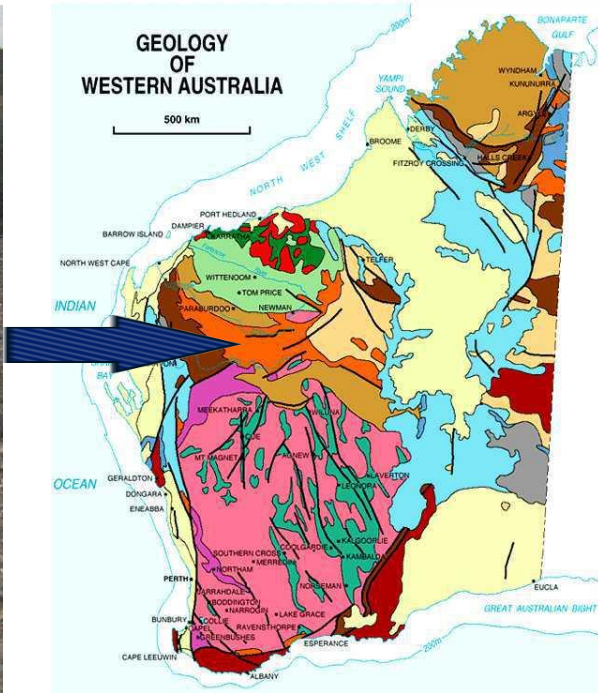
Late 1995: Wiluna, 700km north-east of Perth





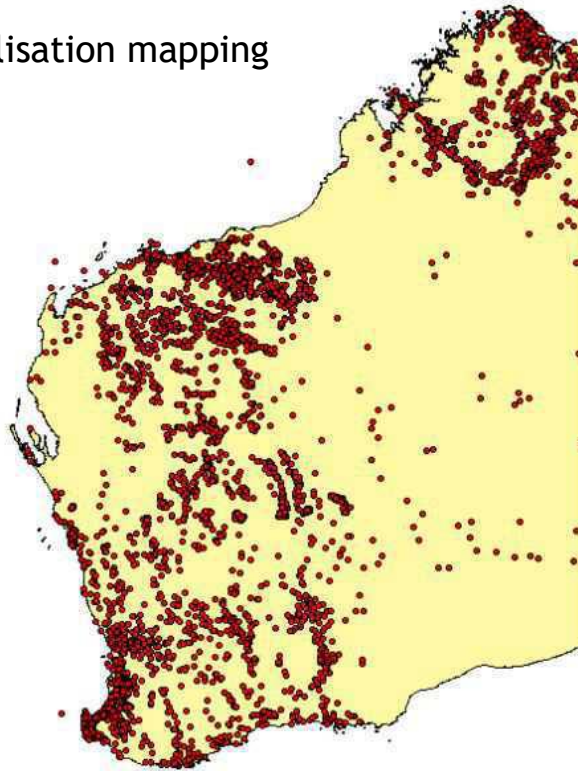


1995-98: Bangemall Basin Mineralisation mapping



Mineralisation mapping

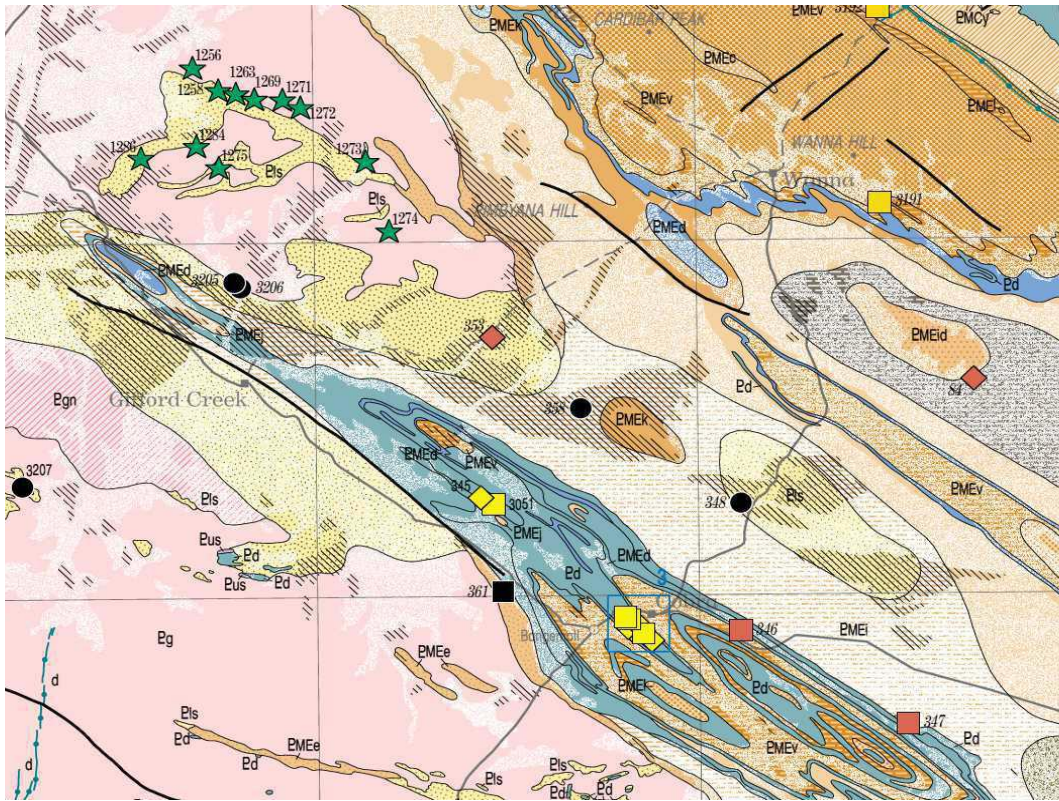
WAMIN  
occurrences  
in WA, 8622



DGPS, Dry Blowing and the World's Largest Rock





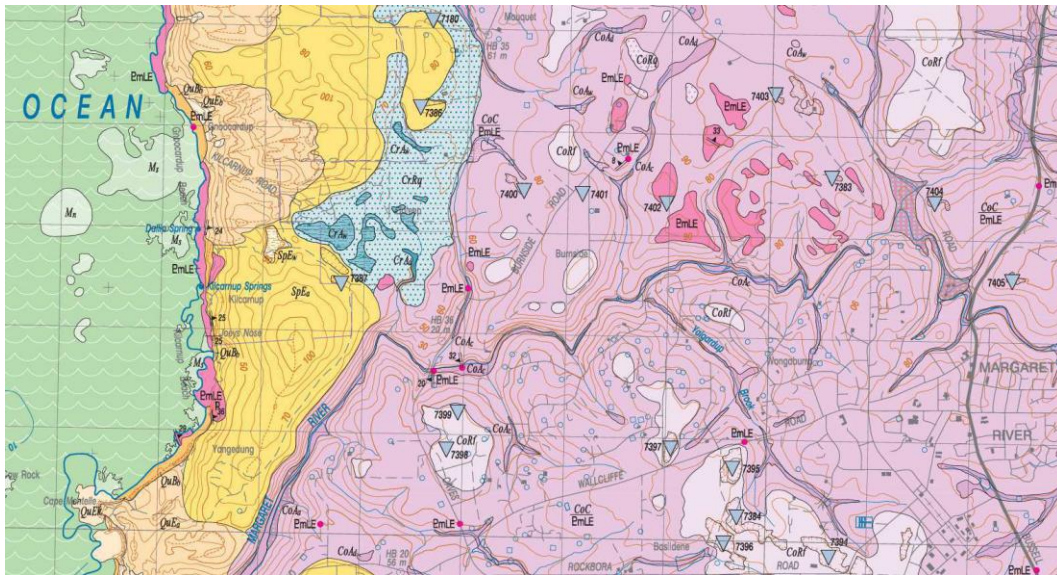


1998-2003: Urban Mapping

This collage illustrates the process of urban mapping in Western Australia from 1998 to 2003. It features four distinct images:
 

- Top-left: A photograph of a road closure with a yellow sign that reads "ROAD CLOSED" and a black and white striped barrier.
- Top-right: A photograph of a field mapper wearing a hat and a pink shirt, sitting on a folding stool and working on a notebook in a natural, arid setting.
- Bottom-left: A photograph of a rocky outcrop with distinct sedimentary layering and a weathered surface.
- Center: A geological map titled "GEOLOGY OF WESTERN AUSTRALIA" with a 500 km scale bar. The map shows various geological units across the state, with red arrows pointing from specific units on the map to the field mapping and rock outcrop photographs.

## 1:50,000 mapping of Cowaramup (Margaret River)



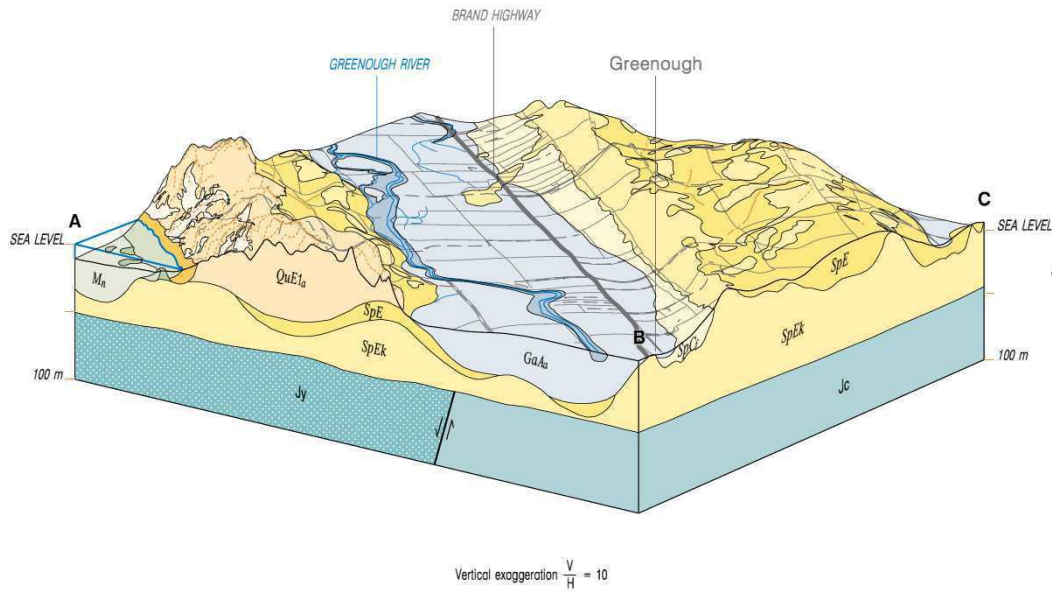
## Fieldwork in the Geraldton



- Meru tip
- Limestone on the escarpment

- Beach and foredune
- Drainage sump





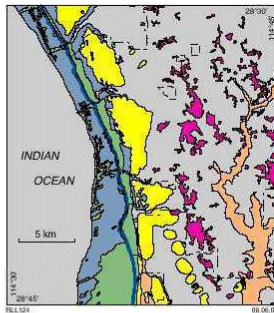
Langford

## Mineral resource potential

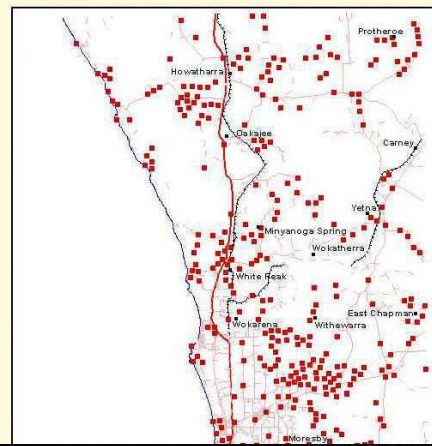
### Overview

The mineral resource potential of HOWATHARRA is limited to base metals, heavy minerals, and a small range of construction and industrial minerals, including gravel, sand, limestone, limesand, stone, and clay, is also referred to as basic raw materials. There is potential for the extraction of large quantities of all of these basic raw materials except clay, but at present there is a limited market that is adequately serviced by existing extractive operations in the region. There are no recorded occurrences of coal in the Jurassic Cattamarra Coal Measures beneath HOWATHARRA. The mineral resources of the Mid West were reviewed by Flint et al. (2000).

The mineral occurrences on the map are grouped into mineral commodity and mineralization style as described in Appendix 5.



## Field Sites



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**Site number: 70317 (Field number: 6149)**

**Location:**  
MGA Zone: 50 Easting: 266380 Northing: 6843680  
Latitude: 28.51267 S Longitude: 114.61292 E

**Location Description:**  
Southeast of Oakabella, RLL 1267

**Obsdate:** 11/09/99

**Notes:**  
Lead occurrence and exploratory shaft. Small pocket of galena located in the valley.

**Vegetation Description:** sown pasture  
**Slope:** steep  
**Aspect:** S  
**Type:** lower slope  
**Element:** hillside  
**Landform:** rises

re 40. Construction material and resource potential of Howatharra

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**Site number: 70317 (Field number: 6149)**

*Hint: click on thumbnail to see an enlarged photograph*

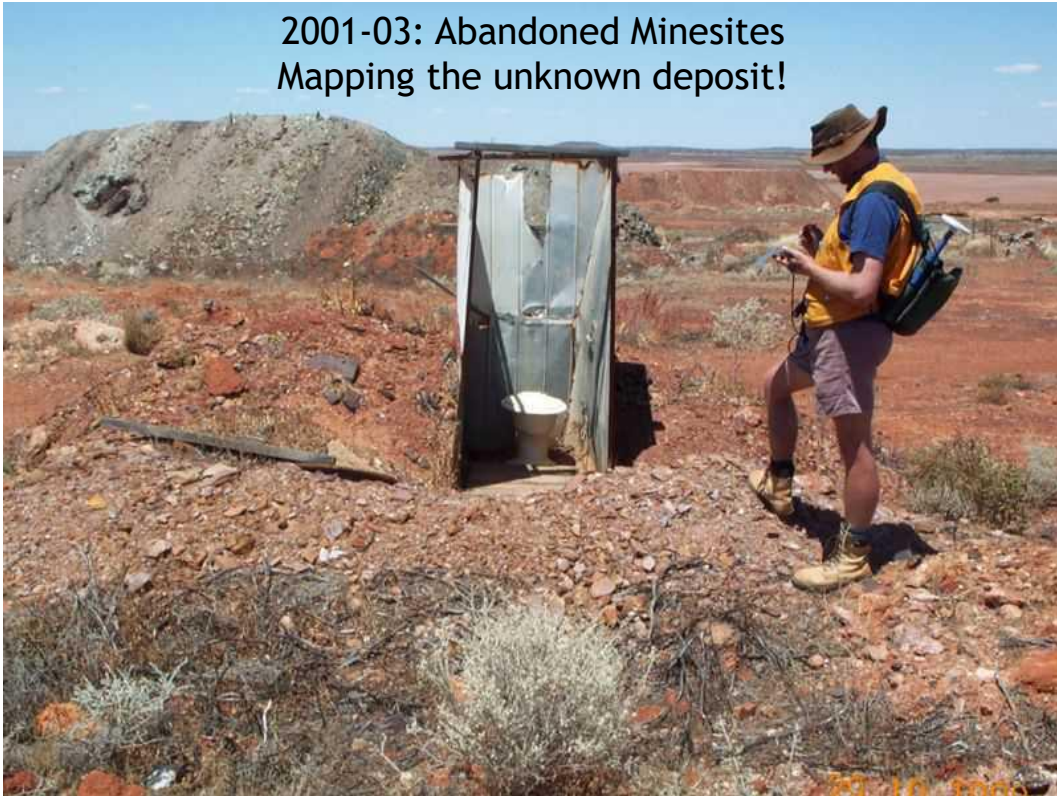


Exploratory shaft at lead occurrence



Shaft located above stream valley

2001-03: Abandoned Minesites  
Mapping the unknown deposit!



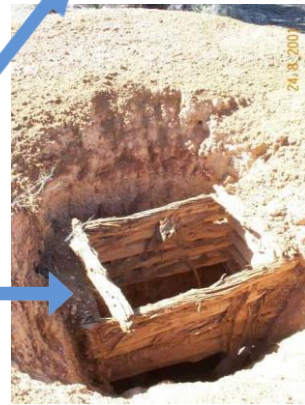
Infrastructure near a collapsed shaft

Active mine shaft

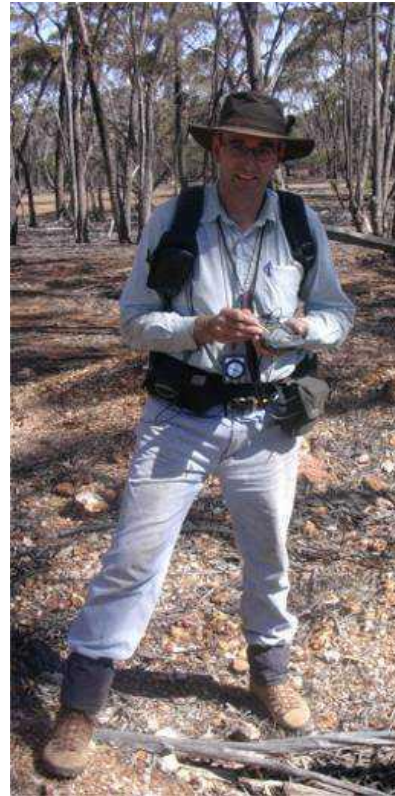


Active erosion of a shaft in a palaeochannel

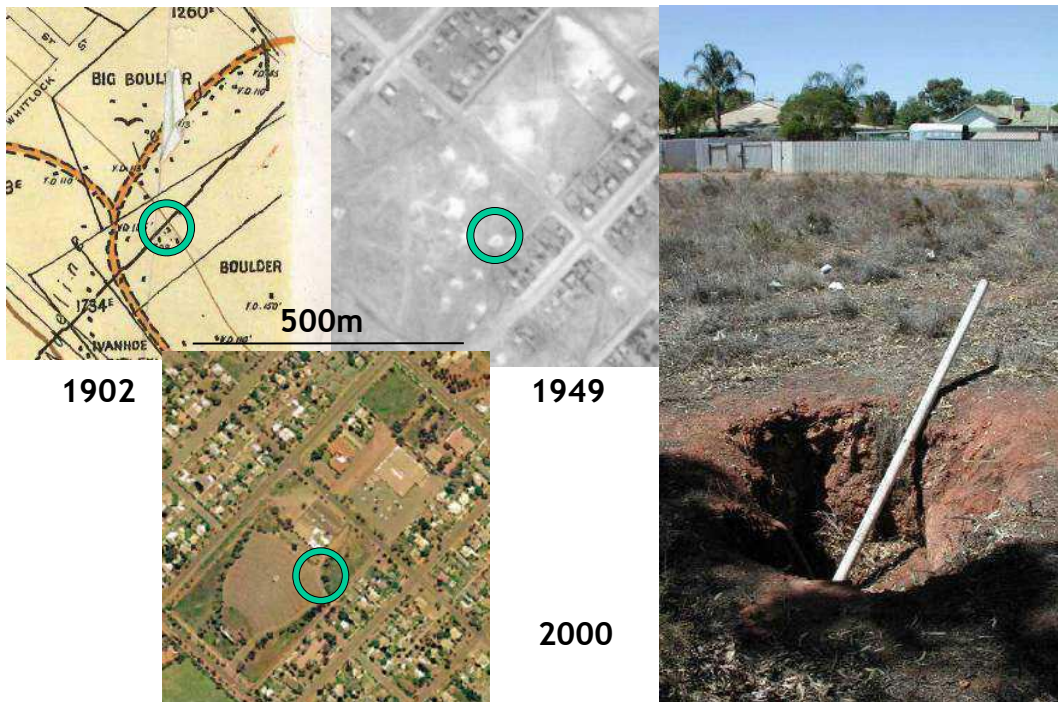
Eroded mine shaft around 100 years old



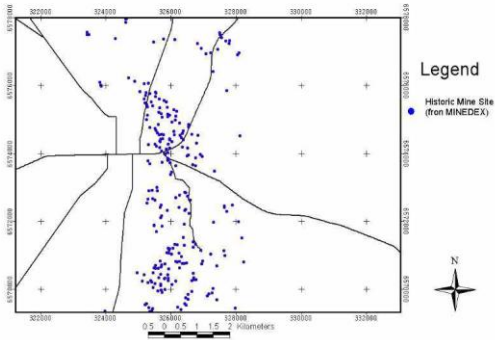
- GPS External antenna
- Compass
- Digital camera
- External power pack (10 hours operation)
- Symbol PPT2800
  - LinksPoint clip-on GPS
  - Ruggedized (4 feet drop to concrete)
  - Colour screen for outdoor use (bright sunlight)
  - Microsoft Pocket PC 2002 operating system
  - 64 MB RAM/32 MB ROM
- Safety gear
  - Satellite phone
  - EPIRB
  - First Aid (snake bite) kit



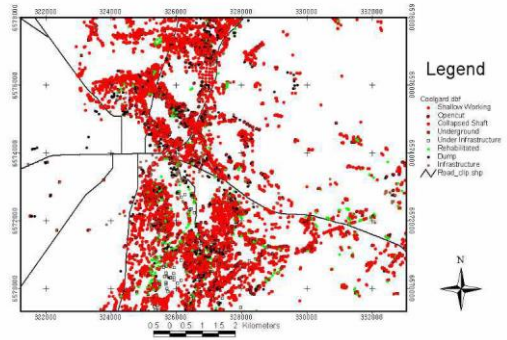
### Kalgoorlie-Boulder: palaeochannel workings below the abandoned drive-in cinema



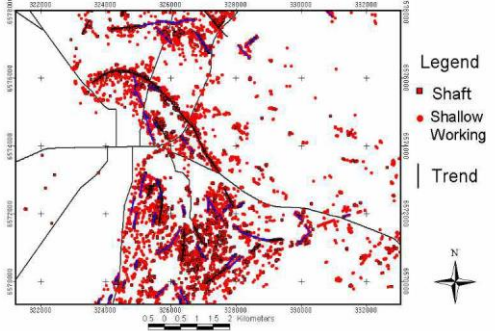
Coolgardie Inset A :Historic Mine Sites



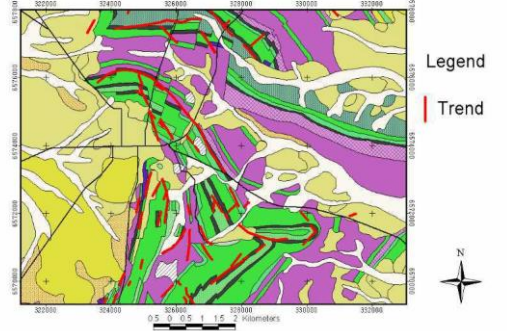
Coolgardie Inset A :All WABMINES Sites



Coolgardie Inset A :Shafts & Shallow Workings



Coolgardie Inset A :Mineralization Trends

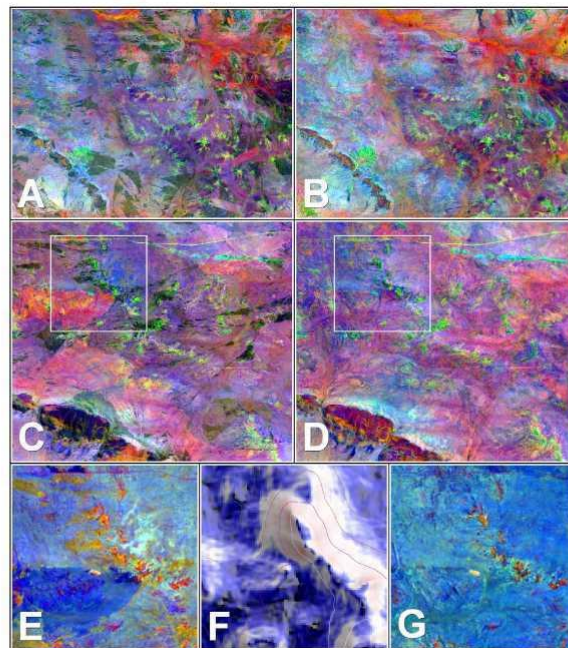
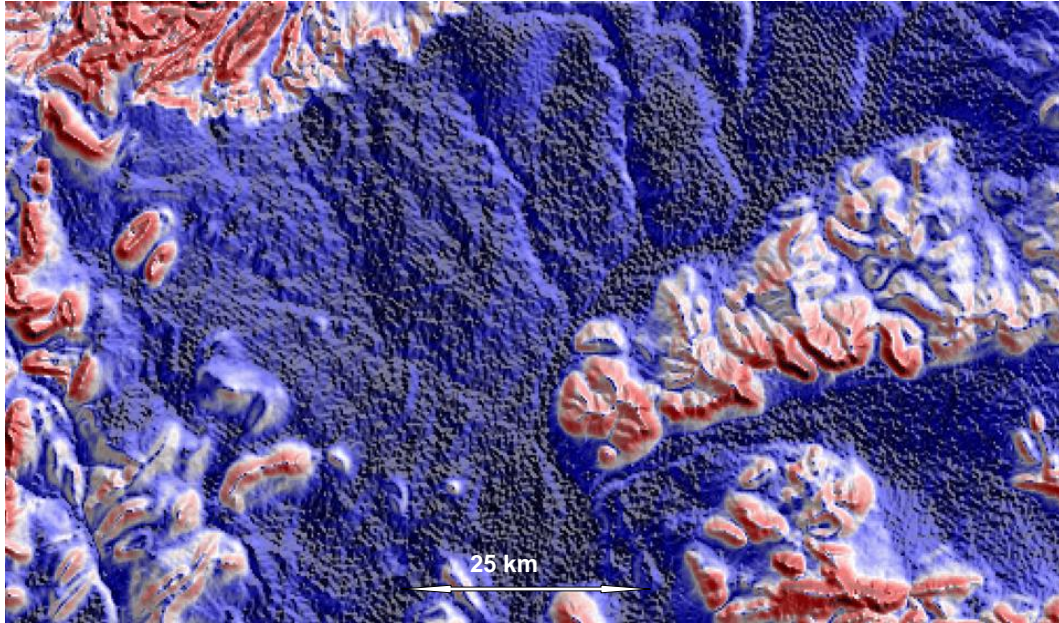


## 2005-07: Regolith-landform mapping, Tanami Desert



# Dissected pediplain

1 in 1000 slope; 3km wide channels; sides 1 in 300



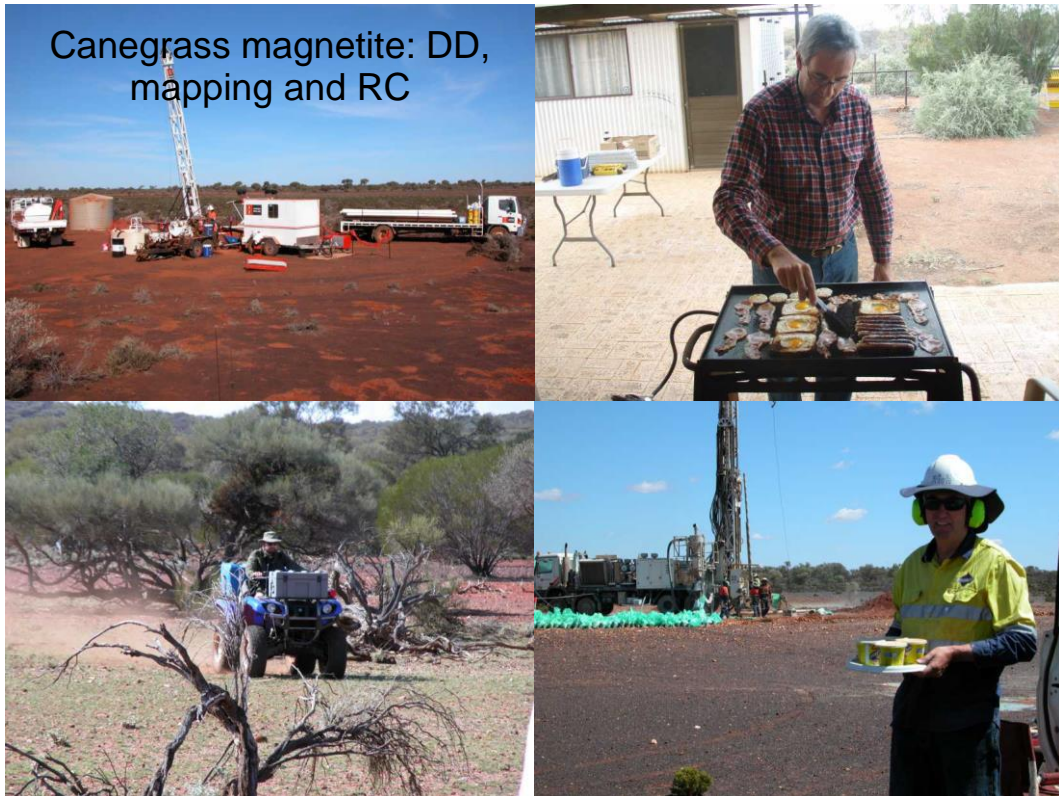
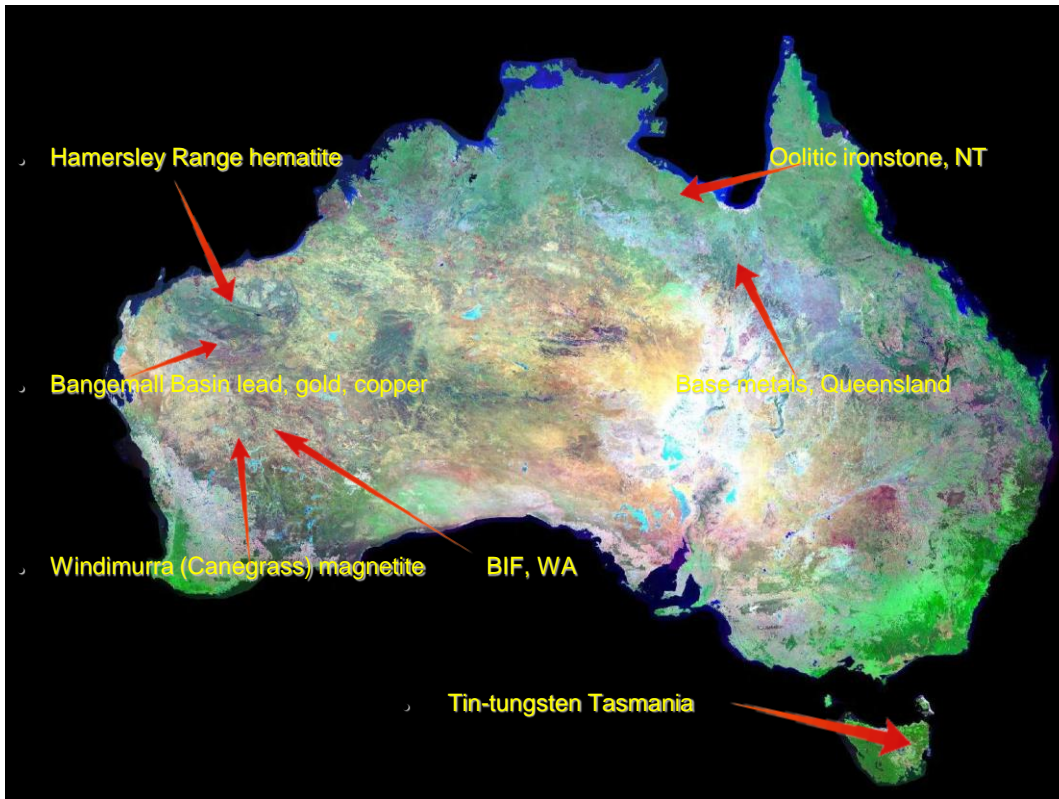
**Fig. 10.** Comparison of recent Landsat 8 with Landsat TM3 in the Tanami gold province, Western Australia, using Gozzard Ratios (5:7:4:7:4:2). (A–C) Regional-, local- and outcrop-scale, recent single-year (2013). (D–F) Regional-, local- and outcrop-scale, nine-year TM3 (1989–2013). (G) Multiscale enhanced SRTM slope, north-east illuminated; black 0°, blue 0.3°, white 0.6°, red 2°; contours 410–460 m. Regional area 110 × 83 km, centre 20°00'S 129°00'E; local area 28 × 24 km, centre 19°59'S 128°31'E; close-up (white box) 10 × 10 km 19°55'57"S 128°27'45"E.



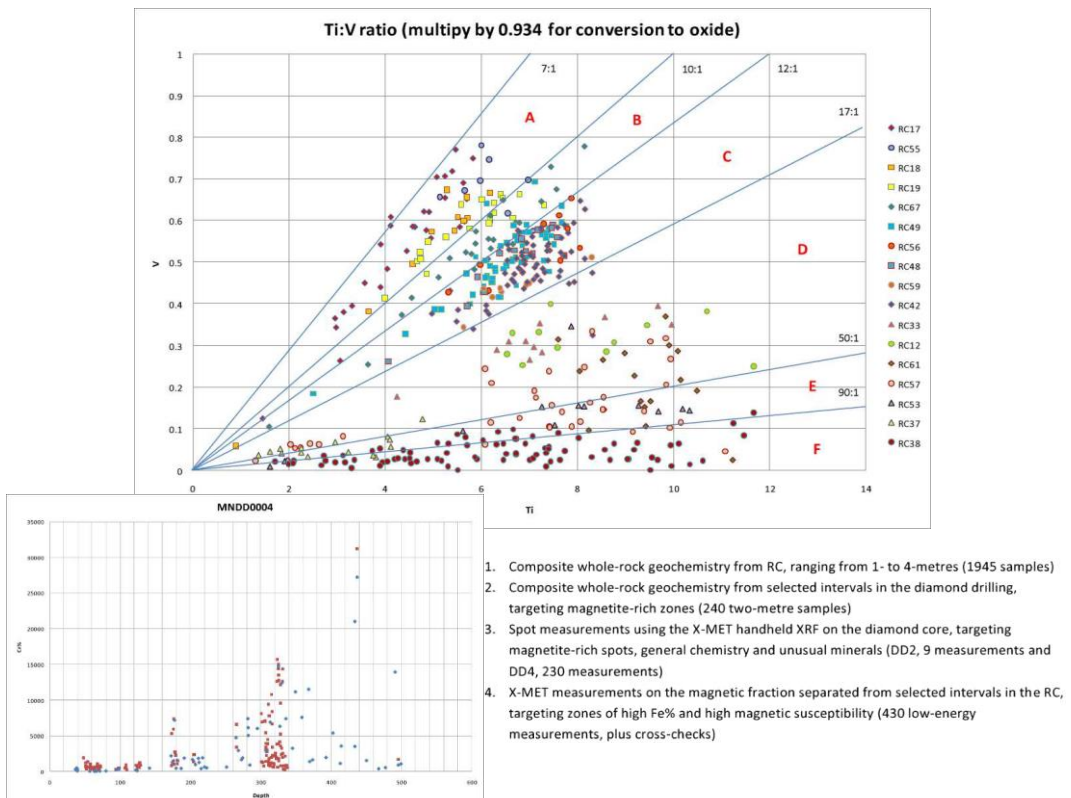
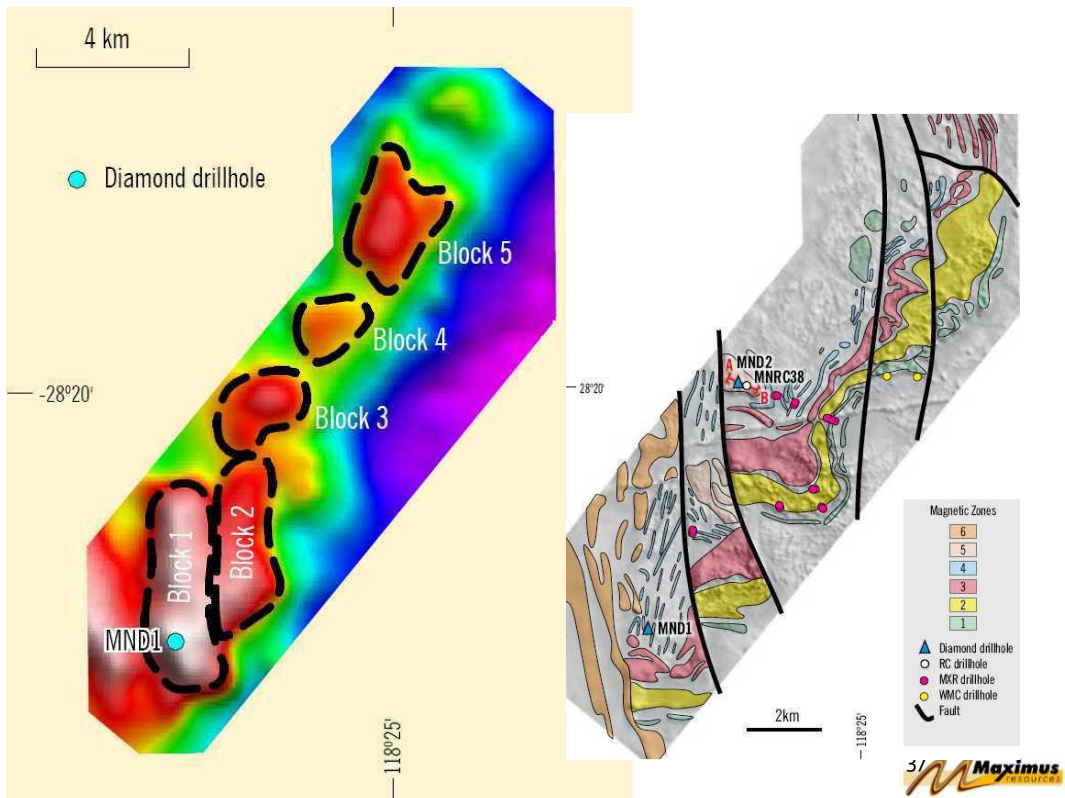
## Company exploration post-GSWA

- 2008: Maximus Resources
  - Windimurra (Canegrass) magnetite (early Archaean)
- 2008-10: Flinders Mines
  - Hamersley Range hematite (Proterozoic CID, DID and BID)
  - Windimurra magnetite
- 2011: Nemex Resources
  - BIF, WA (Archaean) and remote sensing, Sierra Leone
- 2011: TNT Mines
  - Tin-tungsten Tasmania (Ordovician)
- 2011-12: Abra Mining (China Minmetals)
  - Bangemall Basin lead, gold, copper (Proterozoic)
- 2012: Sandfire Resources
  - Oolitic ironstone, NT (Hells Gate) and Base metals, Queensland (Proterozoic)
  - Manganese remote sensing, East Timor

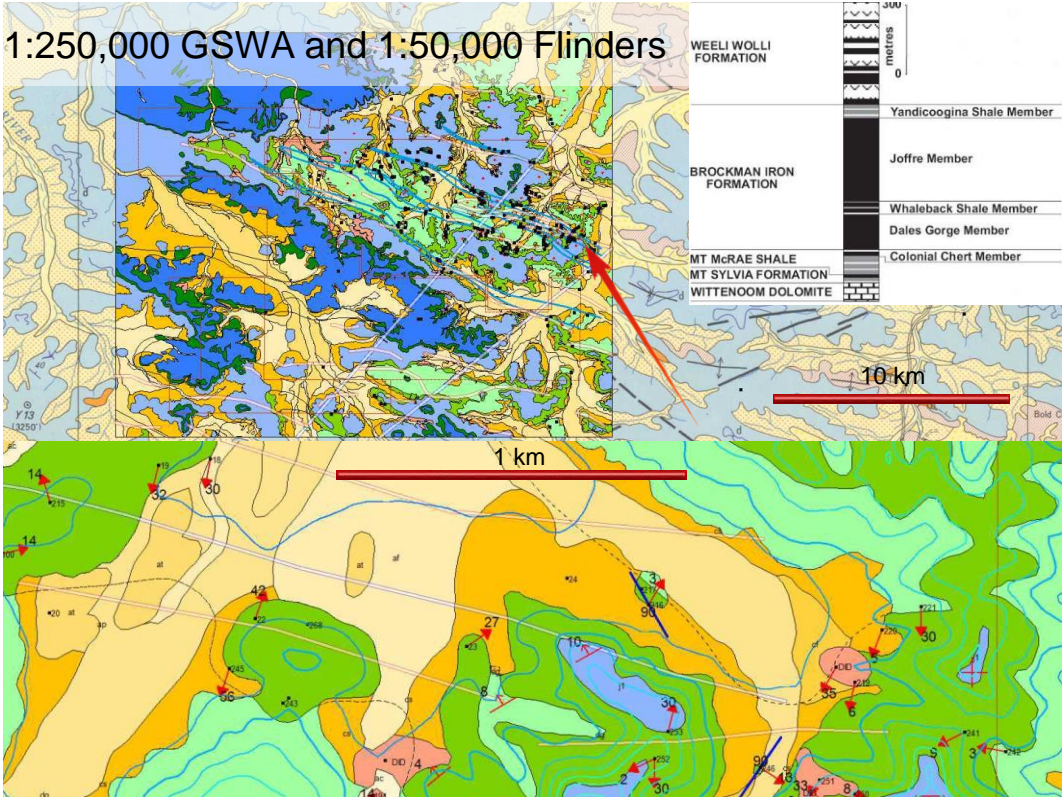


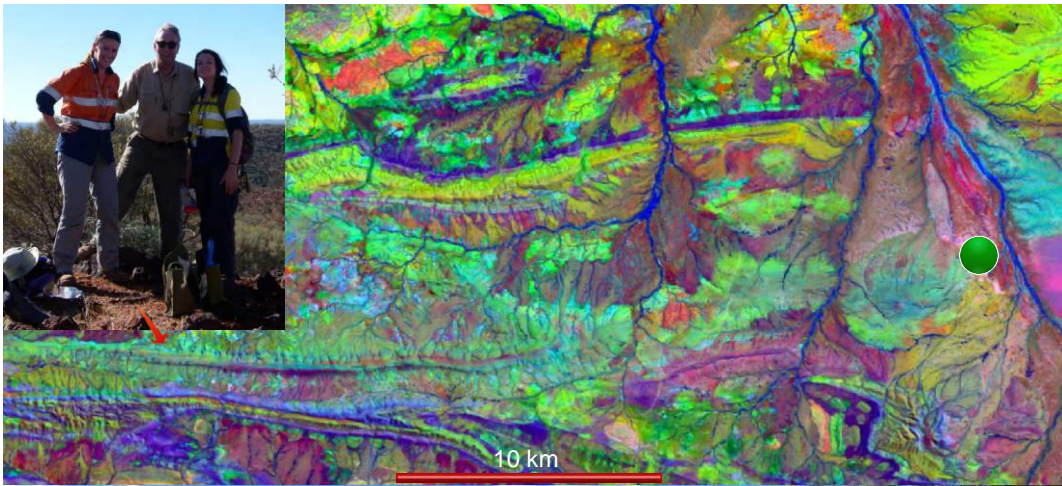




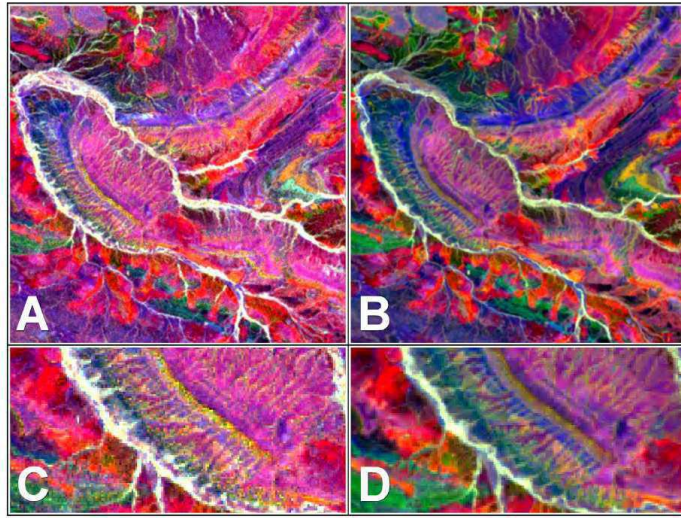


# Hamersley hematite: RC and mapping



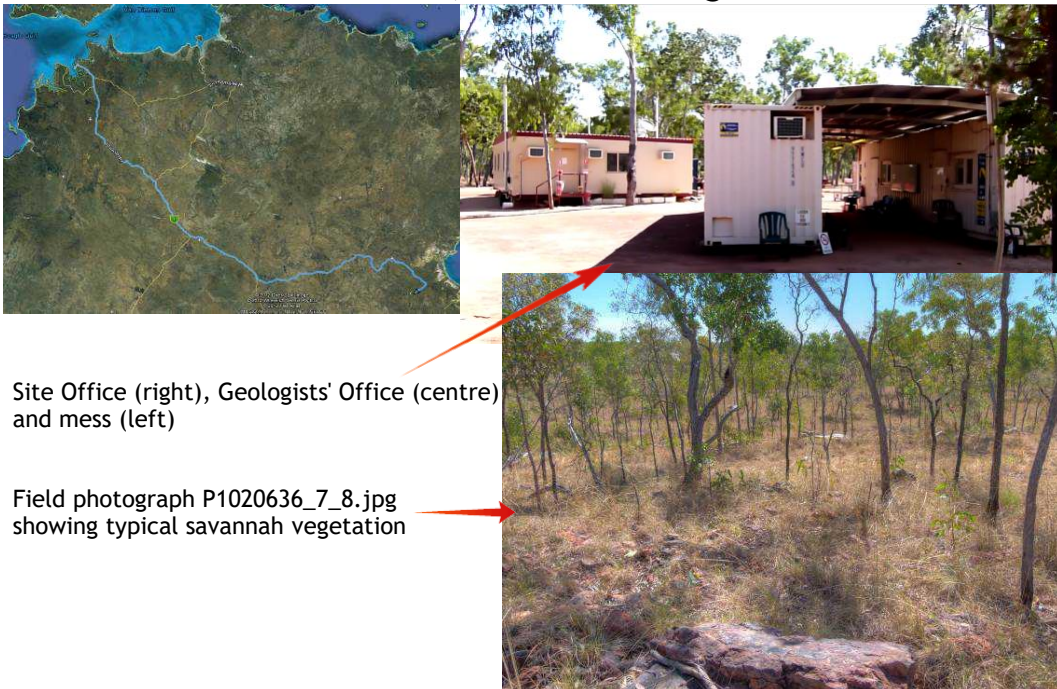


Abra: Bangemall Basin



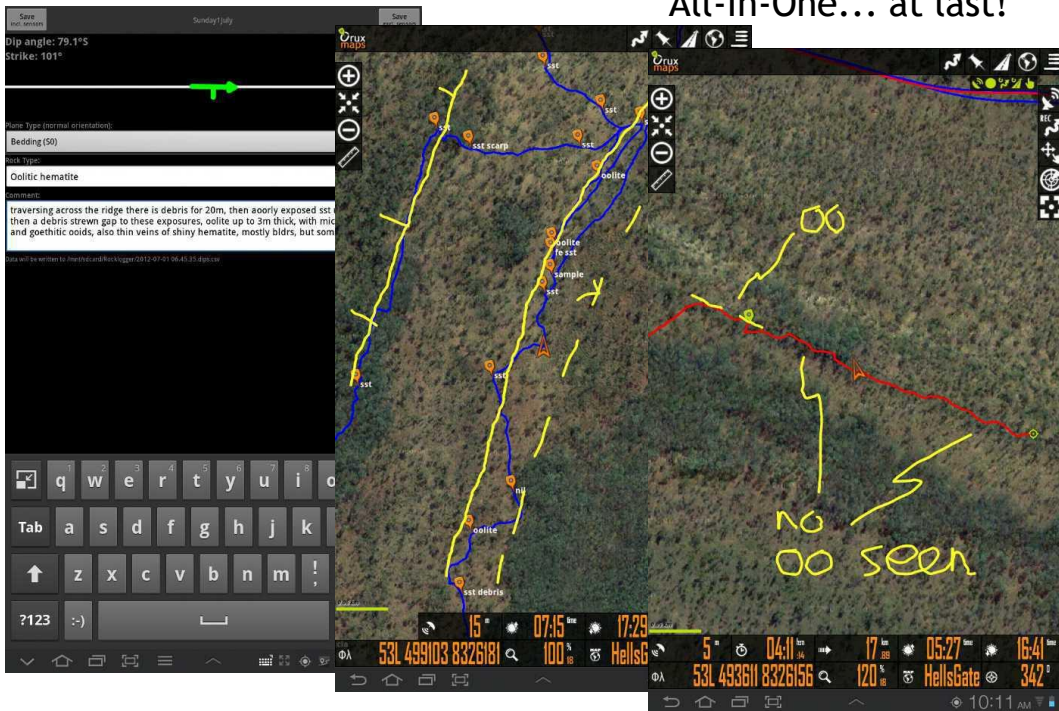
**Fig. 3.** Proterozoic strata in the Bangemall Basin (Capricorn Orogen), Western Australia, 160 km south-west of Newman, using Gozzard Ratios (5/7:4/7:4/2). (A,C) Single-year (2011), (B,D) Nine-year TM3 (1987–2011). Regional area  $10 \times 10$  km, centre  $118^{\circ}38'40''\text{E } 24^{\circ}22'30''\text{S}$ ; detailed area  $5 \times 2.5$  km, centre  $24^{\circ}23'3''\text{S } 118^{\circ}37'13''\text{E}$ .

## Sandfire Resources: Hells Gate 750km, 8 hours driving

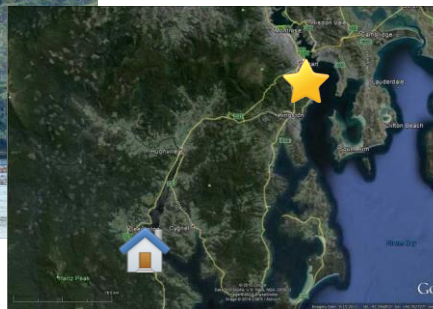




RockLogger & OruxMaps on Samsung 7.7 tablet:  
All-In-One... at last!



# Home in Geeveston 55km from Hobart in the Huon Valley



[www.richardlangford.com](http://www.richardlangford.com)

