

RESOURCING THE TERRITORY

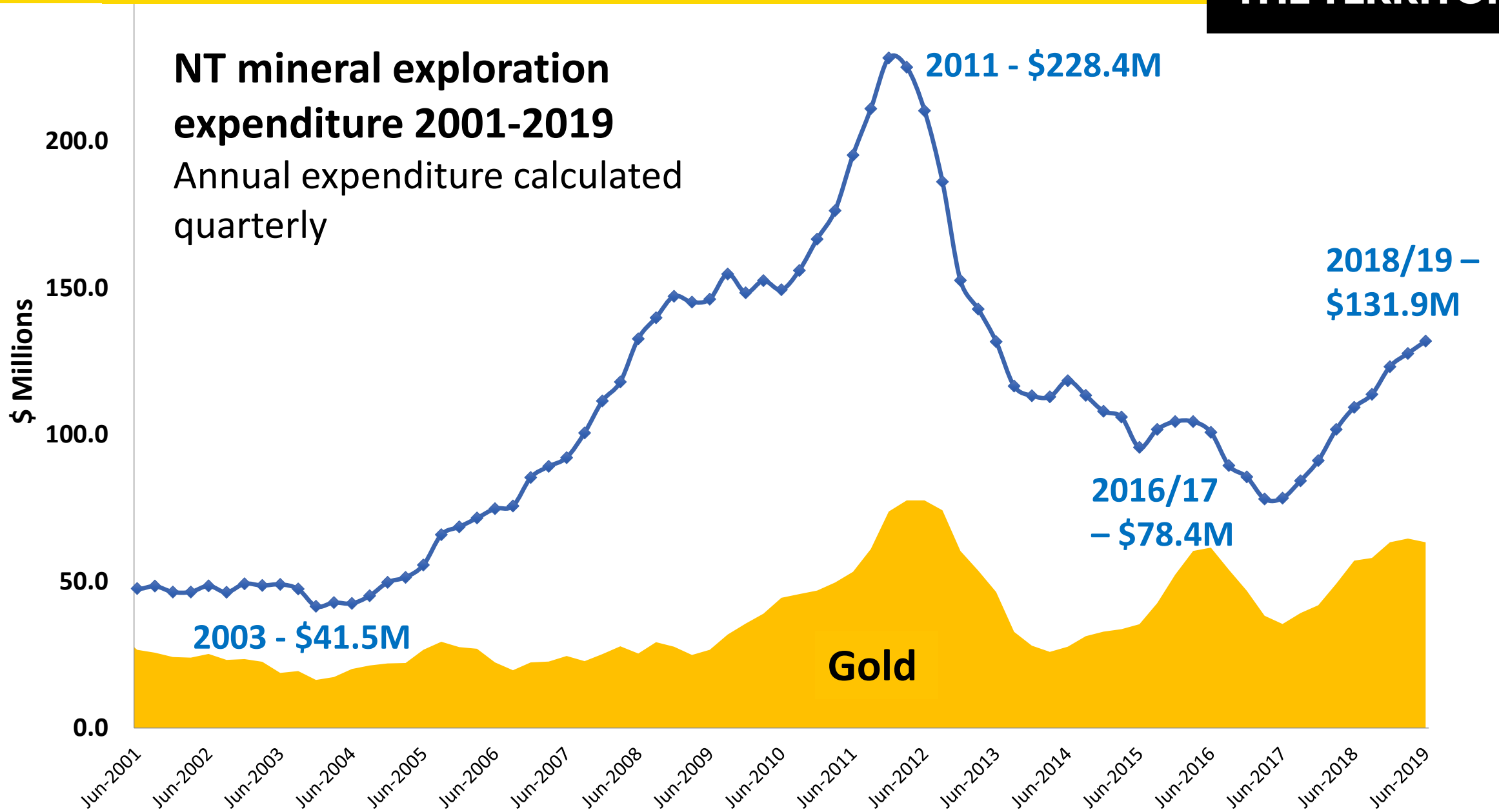
New developments in geoscience and exploration in the NT



Ian Scrimgeour
Executive Director, Northern Territory Geological Survey, DPIR

Mining the Territory

5 September 2019



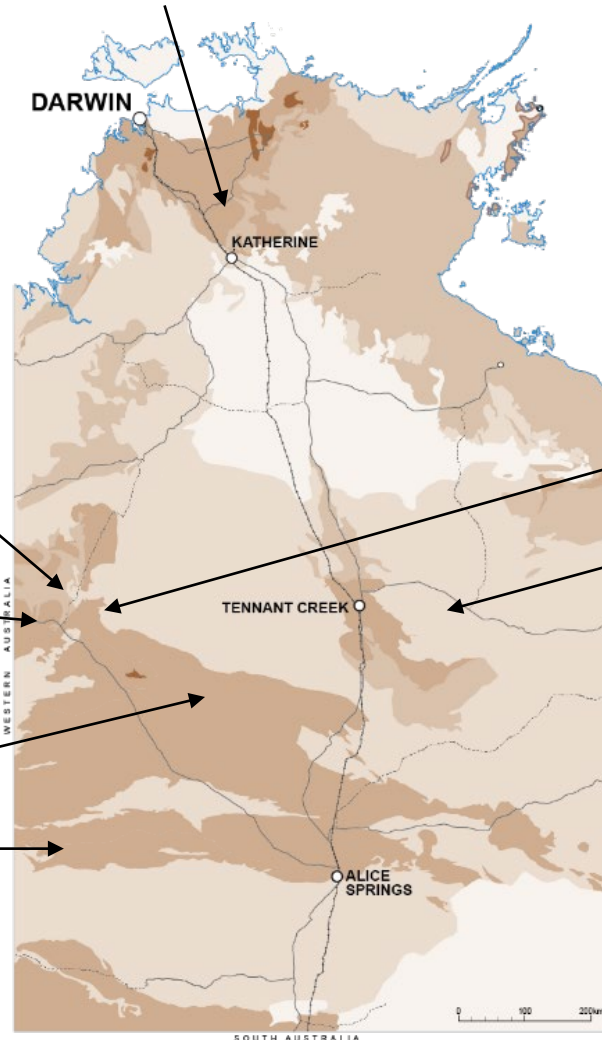
Gold producers with strong cash flow investing in NT exploration



KIRKLAND LAKE GOLD



NORTHERN STAR
RESOURCES LIMITED



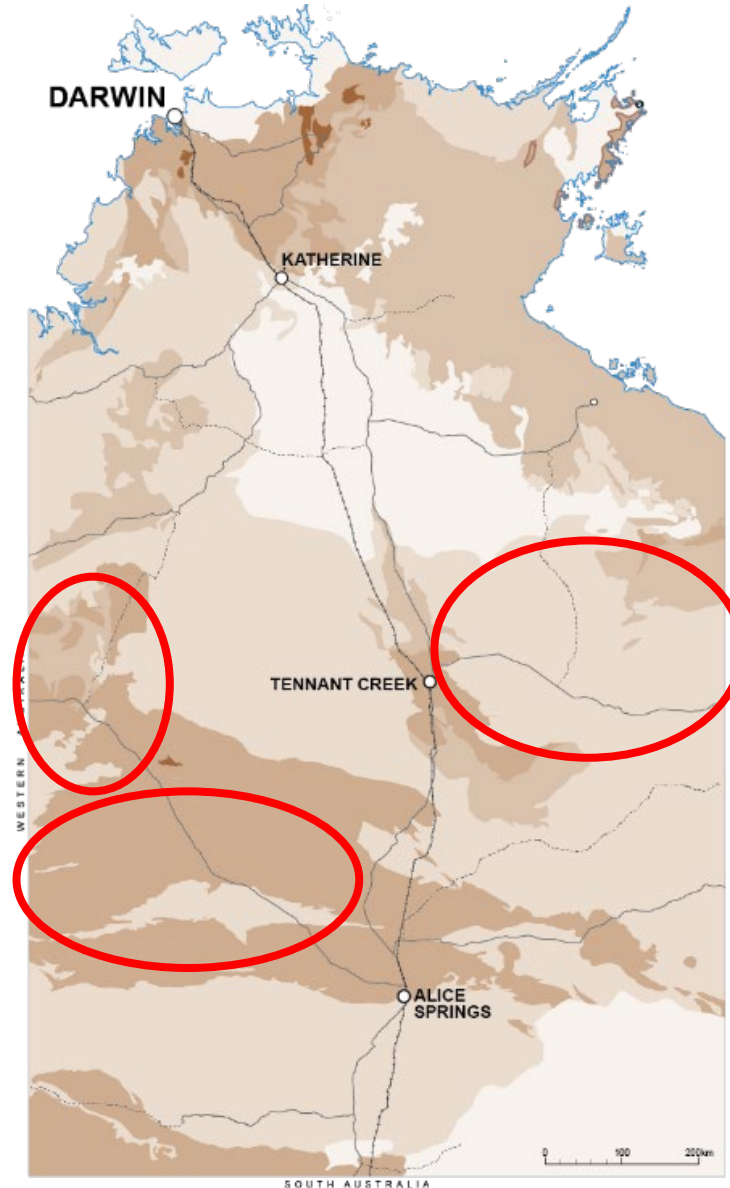
NEWCREST
MINING LIMITED

Tanami

- New phase of greenfields exploration underway with regional aircore and RC drilling of underexplored areas

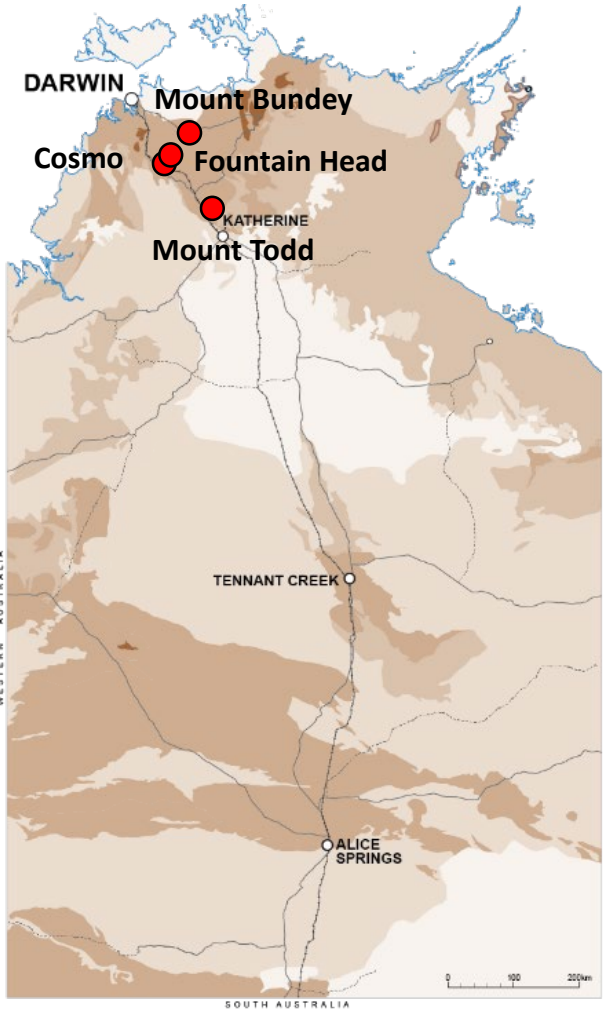
Western Aileron Province

- Effectively unexplored, largely under sand cover
- Major greenfields exploration by **Independence Group** targeting nickel, copper, gold
- New Cu-Au-Ag prospects discovered in Lake Mackay region (**IGO**)
- High-grade zinc-copper discovery by **Todd River Resources** (Hendrix)



Barkly region

- Effectively unexplored under black soil and limestone cover
- New geoscience suggests potential for copper and gold east of Tennant Creek and petroleum and zinc in South Nicholson/Lawn Hill
- **Newcrest Mining** has taken out licence applications east of Tennant Creek
- Focus area for *Exploring for the Future*



Kirkland Lake Gold - *Cosmo*

- Underground development and exploration at *Lantern*
- Multiple rigs drilling at Cosmo, Union Reefs and Pine Creek
- Nol submitted for Union Reefs U/G

Bacchus Resources - *Woolwonga*

Substantial drilling during 2018

Hanking Australia - *Toms Gully*

Planning to recommence underground mining

PNX Metals - *Fountain Head/Hayes Creek*

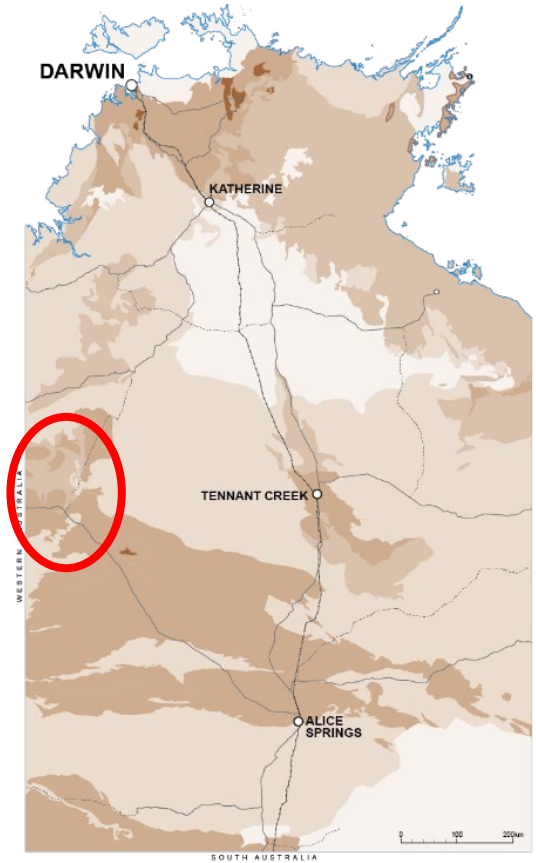
New mineral resource for Fountain Head, ToR released for Hayes Creek EIS

Vista Gold - *Mount Todd*

DFS well advanced, environmental assessment process complete



Drillcore from Lantern



Major new phase of regional exploration underway

Newmont Goldcorp:

- Pre-mining endowment at Callie now 14.2 Moz (4.1 Moz added from 2012-2017)
- 439 km gas pipeline from Amadeus pipeline to Dead Bullock Soak completed
- Exploration joint ventures underway with Prodigy Gold and Nova Minerals



Newcrest Mining:

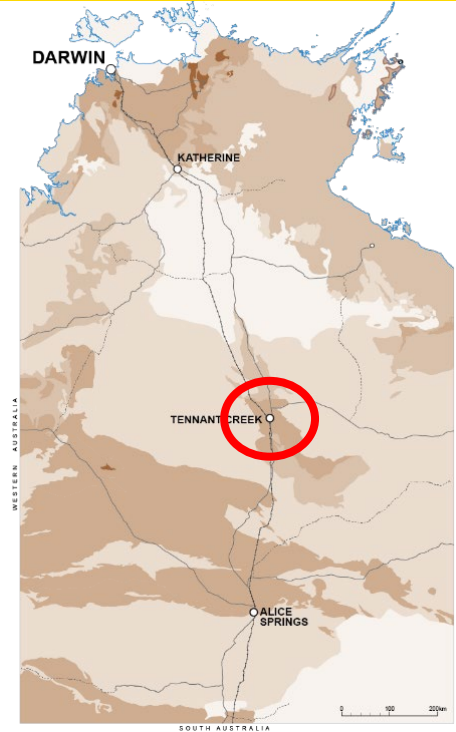
- Major entrant into Tanami in 2018, through *Euro JV* with Prodigy Gold and 100% tenure

Northern Star Resources:

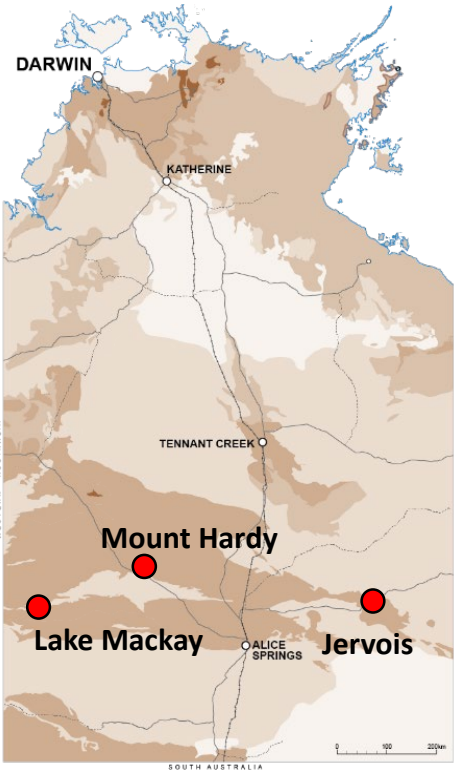
- Substantial footprint in the Tanami
- 18,600m aircore drilling on CTP in H1 2019

Prodigy Gold:

- Aggressive greenfields exploration at *Capstan* and *Galaxy*
- Upgraded resource for *Suplejack*



- Strategic alliance between **Emmerson Resources** and **Territory Resources**:
 - JV and farm-in over ERM's Southern Leases, plus Nobles Nob and Juno
- Territory Resources accelerating refurbishment of Warrego mill
- Drilling ongoing at Mauretania (Emmerson 100%) and The Susan, Black Snake and Three Thirty (Southern Leases JV)
 - Mauretania: **20m @ 38.5 g/t Au incl. 4m @ 158 g/t Au;**
 - The Susan: **11m @ 48 g/t Au**
- **Evolution Mining** looking to vend out copper-rich Gecko mine corridor
- **Westgold Resources** have consolidated tenure over Rover field, planning to demerge Castile Resources into new listed company focussed on NT



Todd River Resources – *Mount Hardy*

New zinc-rich discovery at Hendrix

Maiden Resource (July 2019):

2.6 Mt @ 6.7% Zn, 0.9% Cu, 1.5% Pb, 35 g/t Ag (10.5% ZnEq)

Further drilling underway on extensional and regional targets

KGL Resources – *Jervois*

25.8 Mt @ 1.49% Cu, 27.1 g/t Ag

Commencement of construction targeted for early 2020

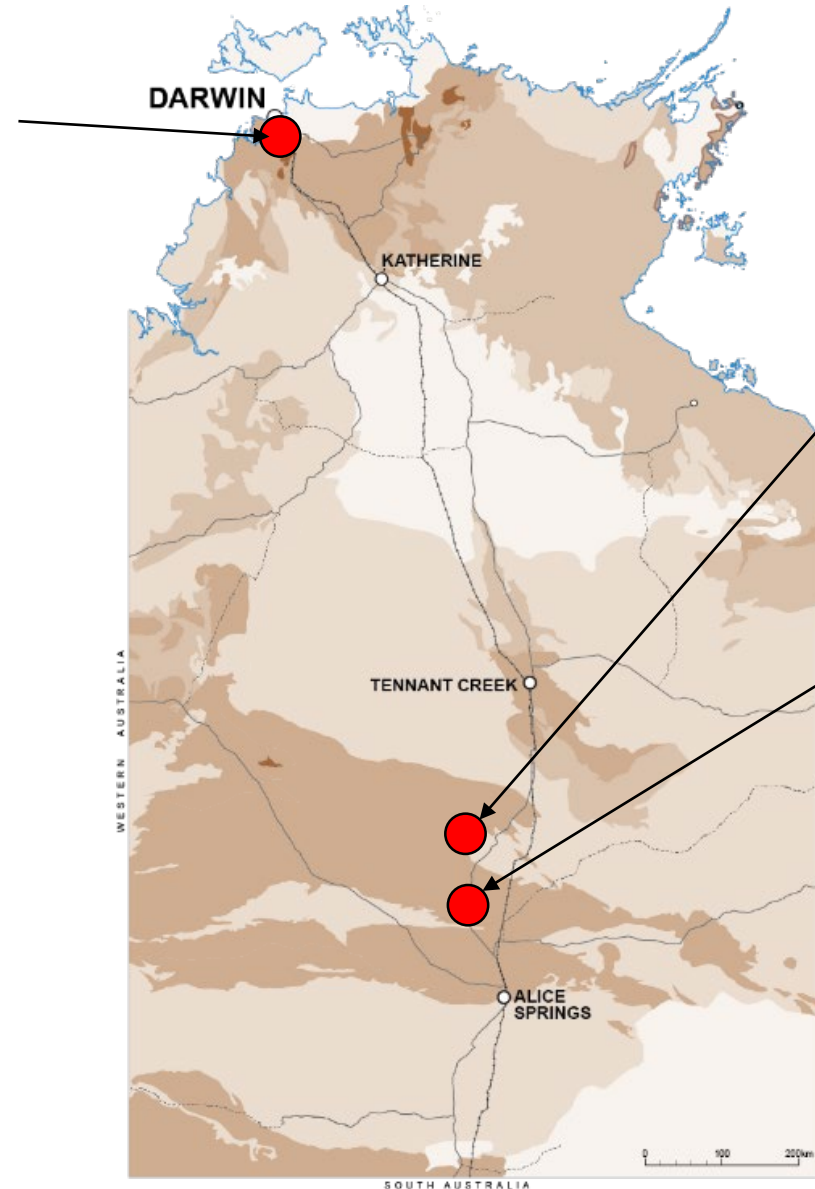
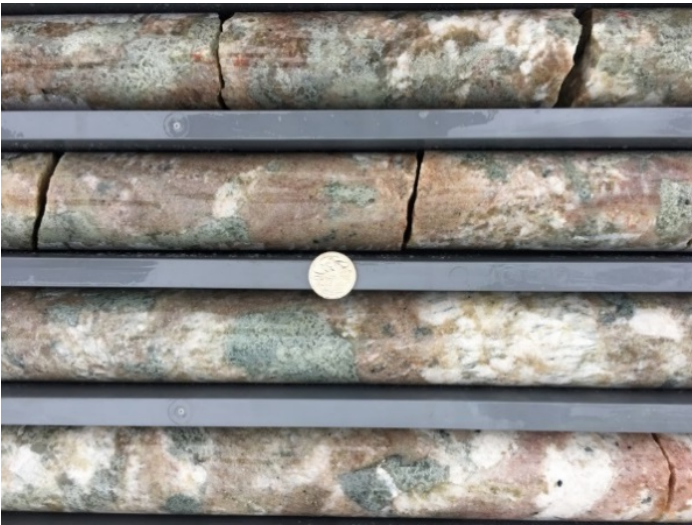
Independence Group/Prodigy Gold – *Lake Mackay*

- High-grade Au-Cu-Ag discoveries at Grapple and Bumblebee
- Regional EM surveys and soil sampling across large greenfields area
- 9600m of RC drilling program in first half of 2019, 5000m planned for 2019/20
- Phreaker prospect: 11m @ 1.15% Cu



Core Lithium- *Finniss project* 9.63 Mt @ 1.3% Li₂O

- Discovered in 2016
- Five resources defined
- Discovery and resource growth ongoing
- Construction planned for late 2019



TNG Ltd: *Mount Peake V-Ti-Fe*
project – processing plant to be located in Darwin

Arafura Resources:
Nolans rare earths – Large NdPr resource - final REO product to be produced at mine site

4 year (2018-2022), \$26 million NT Government initiative to grow the exploration sector

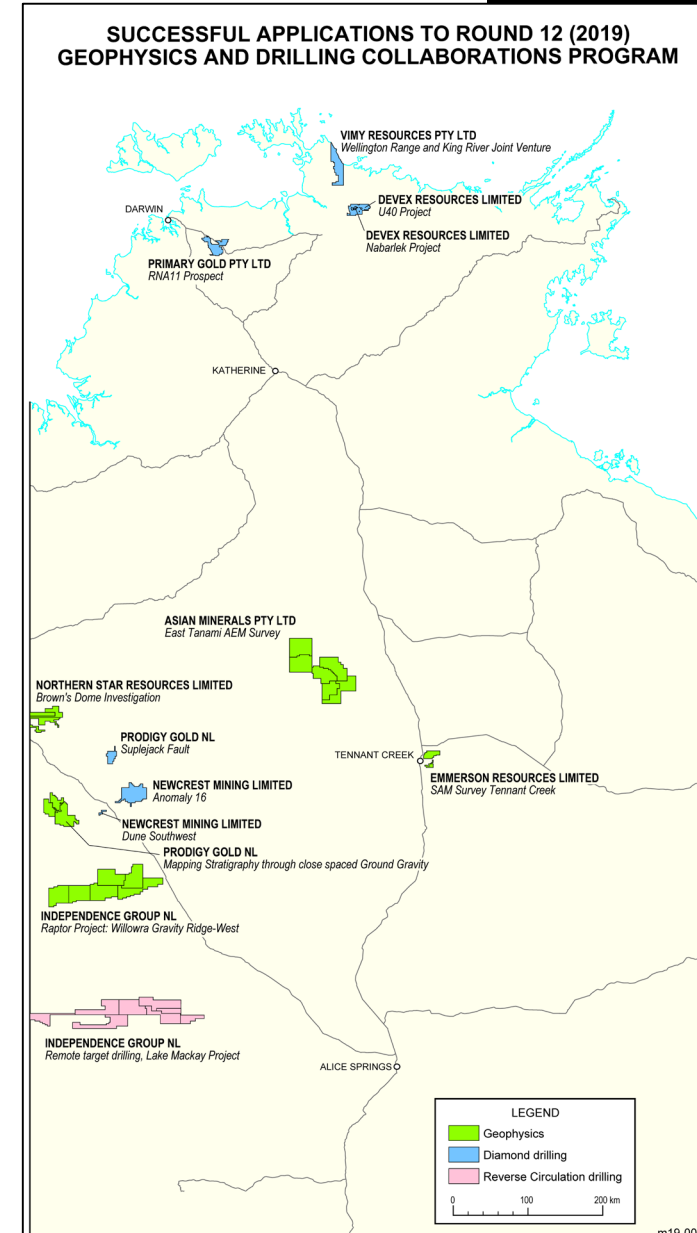
Tanami airborne survey: Photo courtesy of Prodigy Gold



- Supporting industry innovation through grants for greenfields exploration
- Upgrading the Territory's coverage of geophysical data
- Unlocking the resource potential of the Barkly and Gulf regions
- Stimulating greenfields exploration in central Australia
- Promoting the Territory's resource potential and investment opportunities; and
- Making exploration and geoscience data more accessible

Geophysics and drilling collaboration program

- Under the *Resourcing the Territory* initiative grant funding is available to exploration companies for drilling or geophysical acquisition in areas of data paucity or to test innovative techniques
- Up to 50% of costs to a max of \$125 000 for diamond drilling and \$100 000 for RC drilling or geophysical acquisition
- All data open file 6 months after completion of program
- An **additional \$10 000** funding will be offered to engage NT enterprises to complete works.
- **Round 12, 2019:** 13 projects awarded funding: 7 diamond drilling, 1 RC drilling, 5 geophysics
- Call for applications for next round of co-funding will be in February

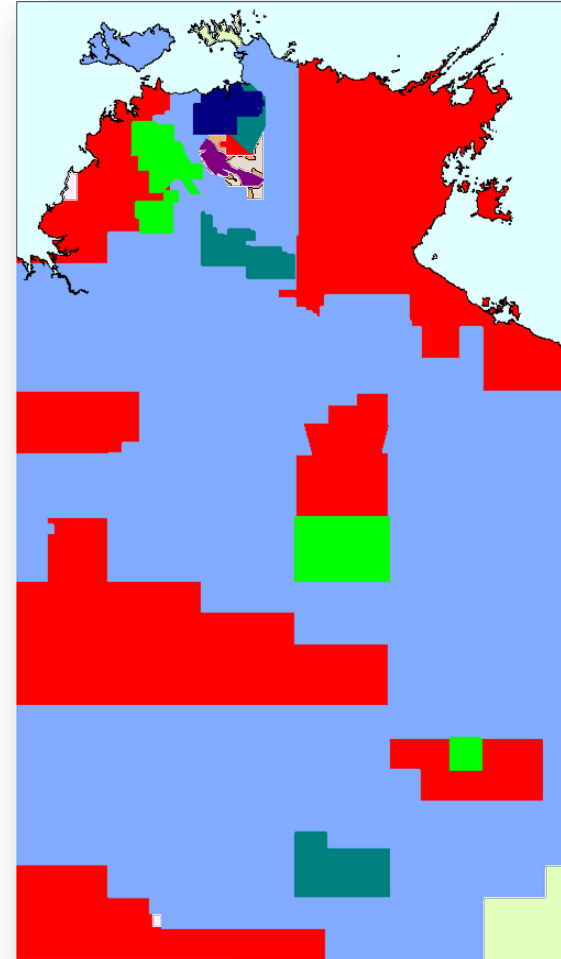


Geophysical data coverage of the NT

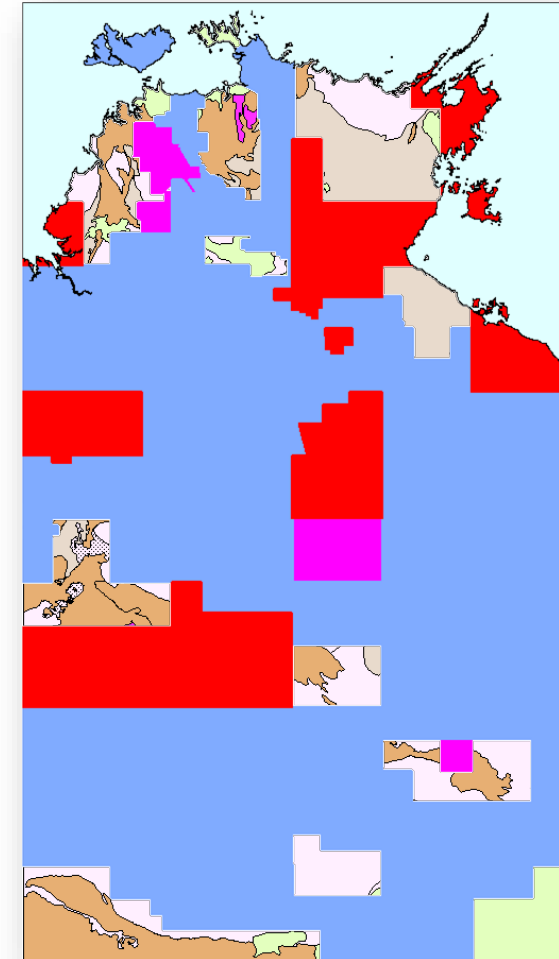
- ~36% of the NT not covered by mag-rad at minimum standard (400m line spacing & 80m flight height with differential GPS)
- Priority under *Resourcing the Territory* to upgrade areas of old and/or poor quality geophysical coverage
- 200m line-spaced magnetic coverage over basement provinces
- 2 km infill of gravity in key areas
- Industry infill encouraged



Current coverage



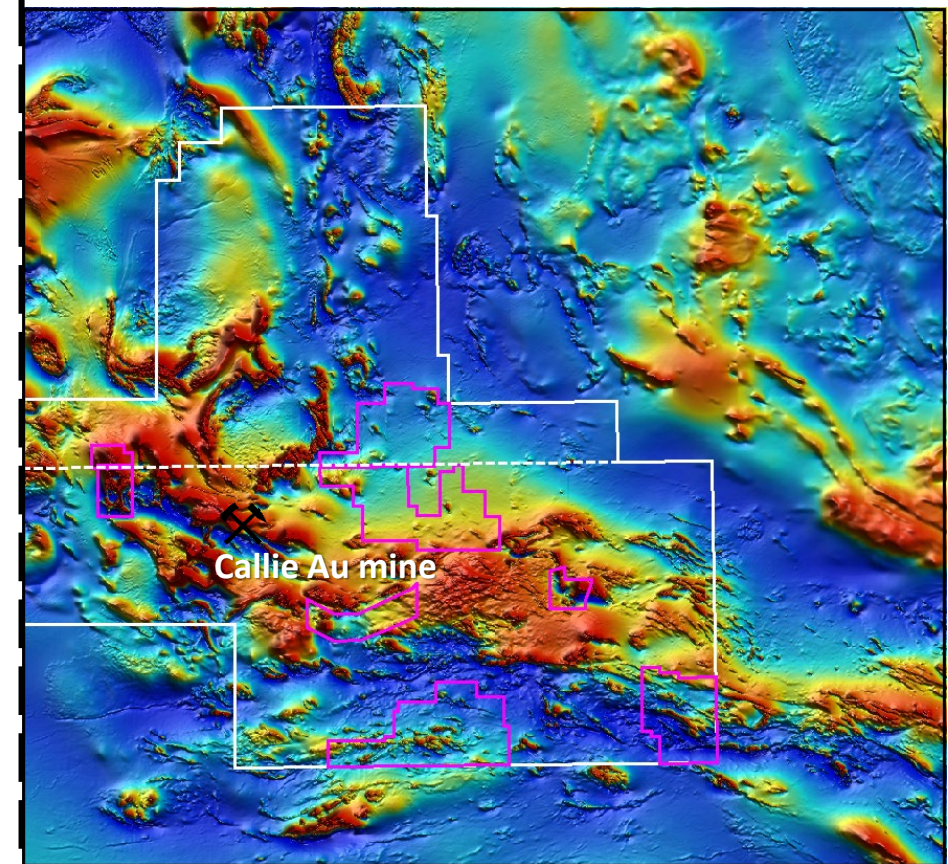
Acquired using GPS navigation



Tanami airborne magnetic and radiometric survey (2018)

- Seamless coverage of highly prospective, non-outcropping gold province
- ~ 240,000 line km @ 200 m line spacing
- >30,000 line km of industry infill to 100 m line spacing
- >42 000km²
- Funded by NTGS with infill funded by industry; contract management and QA/QC by GA
- Preliminary data released

NTGS Tanami Survey (industry infill in pink)

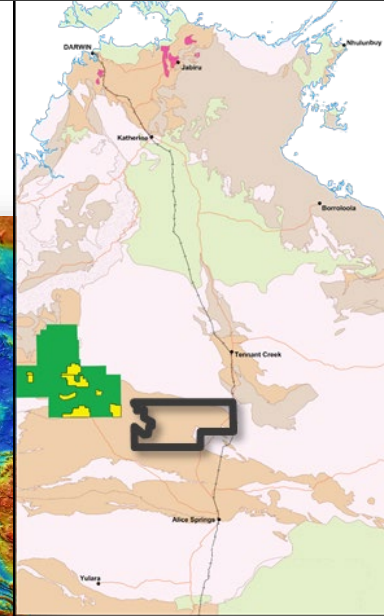
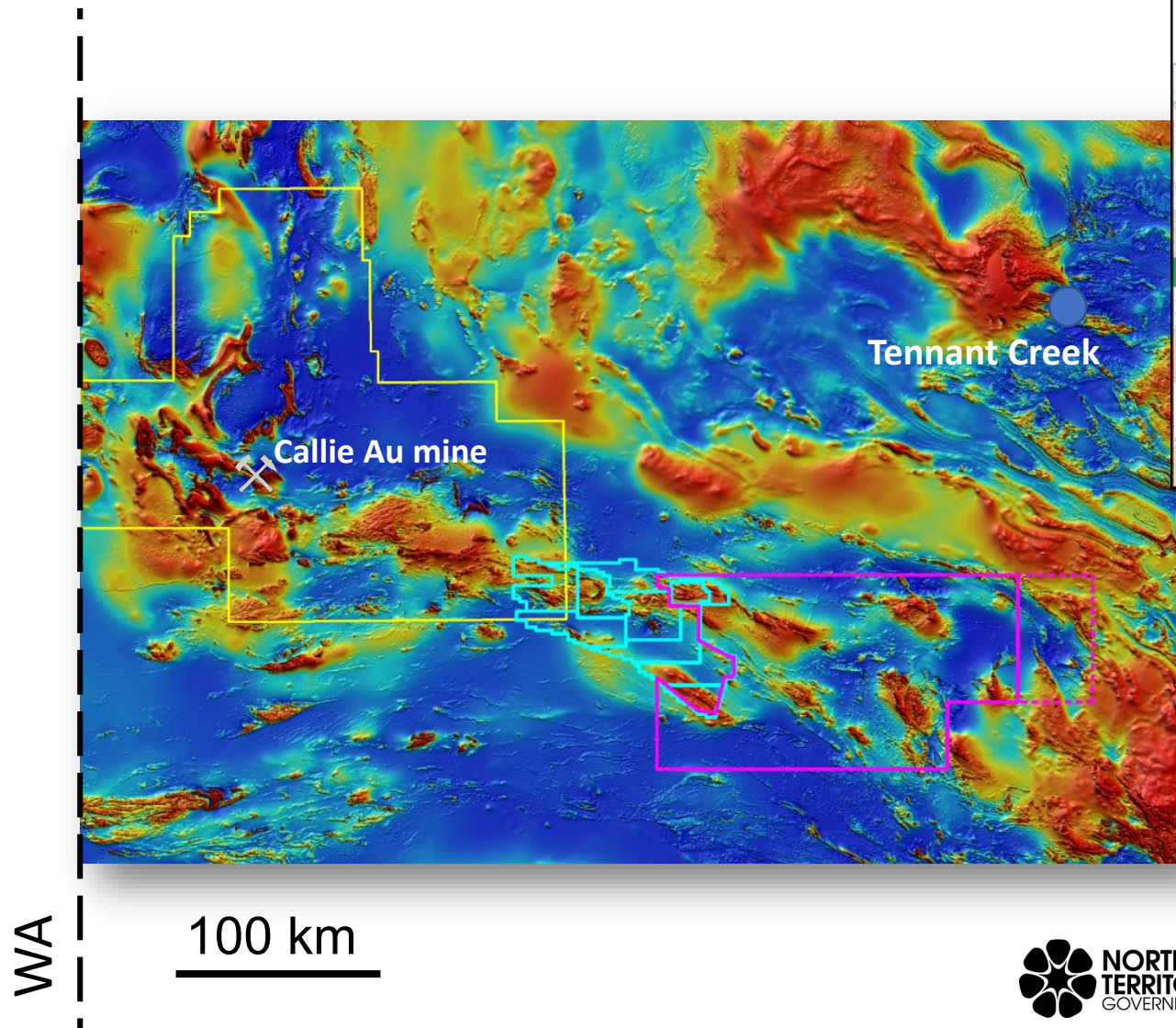


WA

100 km

Mount Peake-Crawford airborne magnetic and radiometric survey (2019)

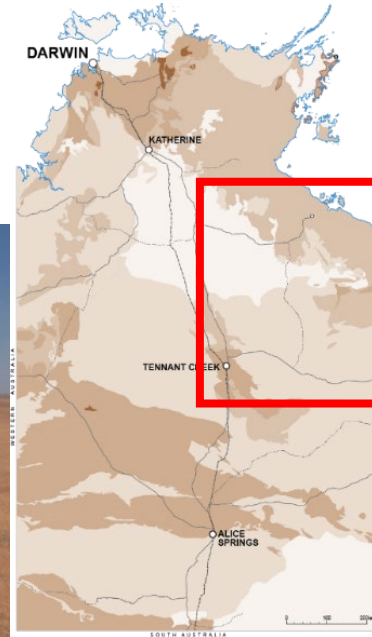
- Northern Aileron province (potential for Au, Cu, Ni, V, Li, Zn)
- 115,000 line km @ 200 m line spacing – industry infill to 100m
- 18 000 km²
- Extending the Tanami Survey through linking 2019 IGO co-funded survey
- Currently being acquired, managed by GA



Tanami Survey (yellow outline)

GDC Rnd 11 survey (blue outline)

Mount Peake-Crawford Survey (pink outline)



Building on work in greater McArthur Basin

New focus on South Nicholson Basin and Lawn Hill Platform

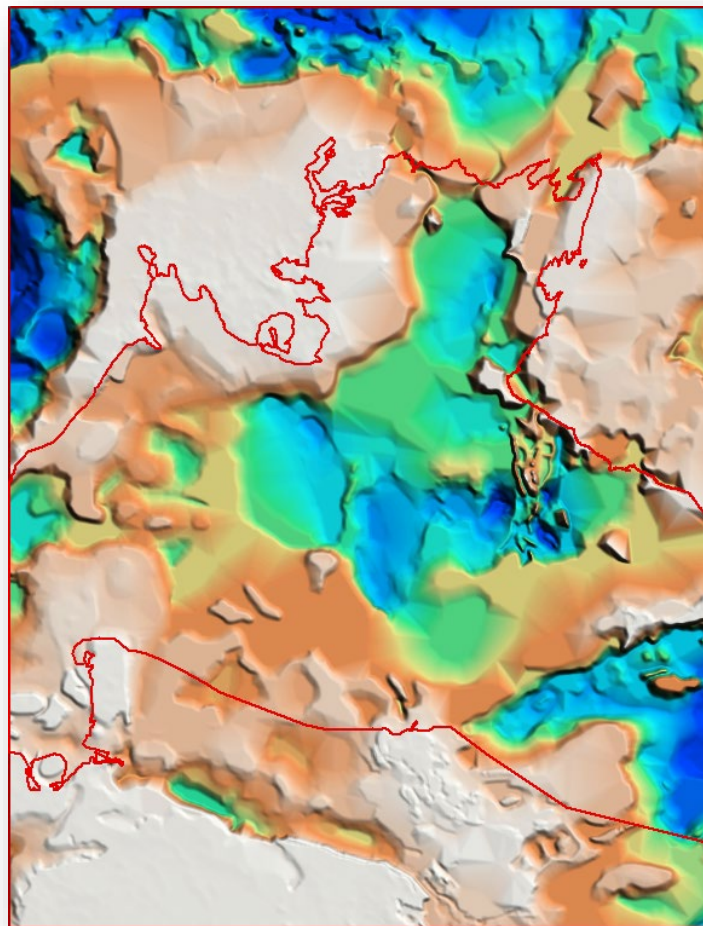
Programs to highlight resource potential in Tennant Creek area

Major collaborations:

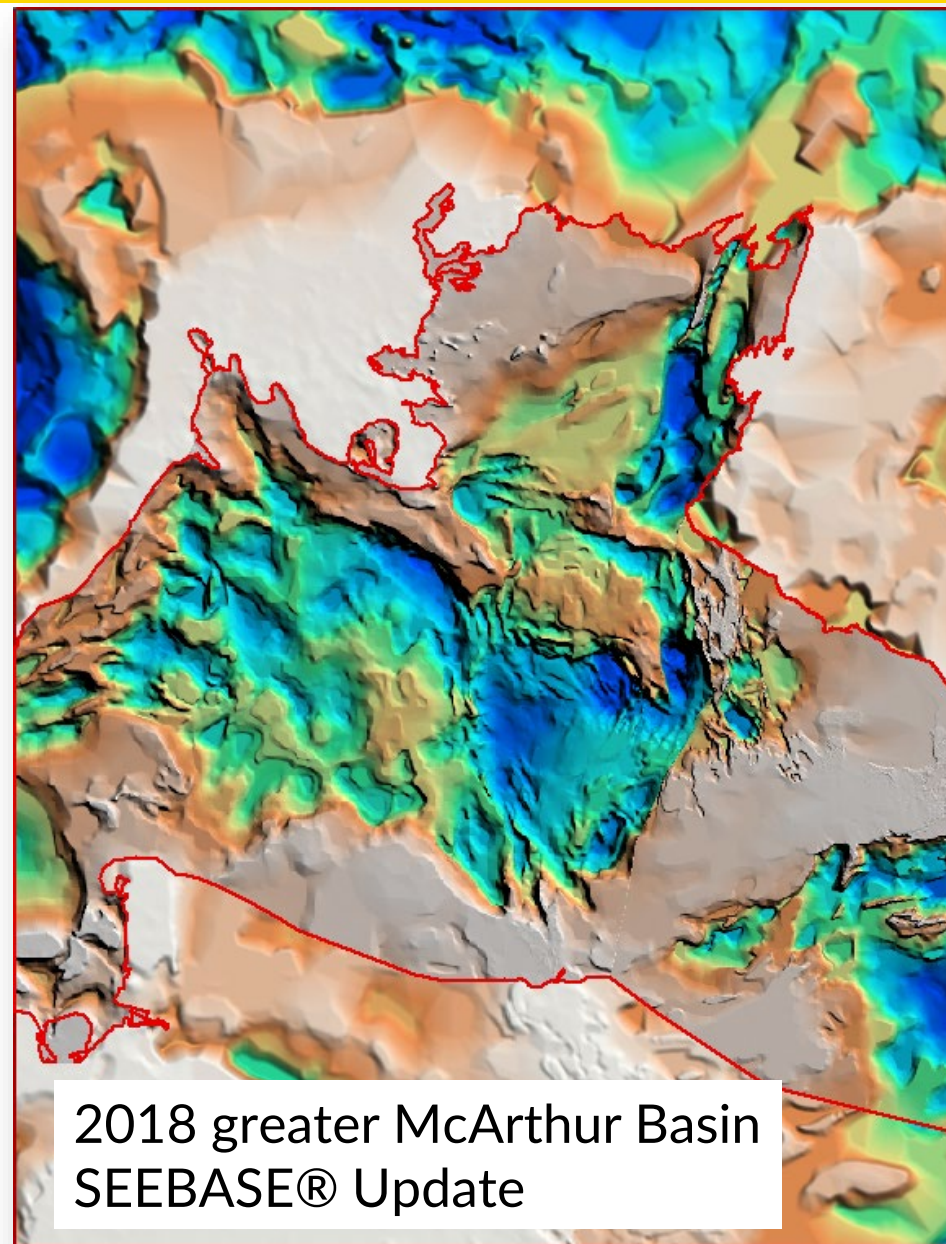
- Geoscience Australia/GSQ under *Exploring for the Future*
- CSIRO including embedded researchers
- ARC linkage with Adelaide Uni & industry

*South Nicholson seismic survey
(courtesy of GA)*

Imaging the depth and structure of NT basins



2006 OZ SEEBASE



2018 greater McArthur Basin
SEEBASE® Update

Greater McArthur
Basin SEEBASE®
released in 2018

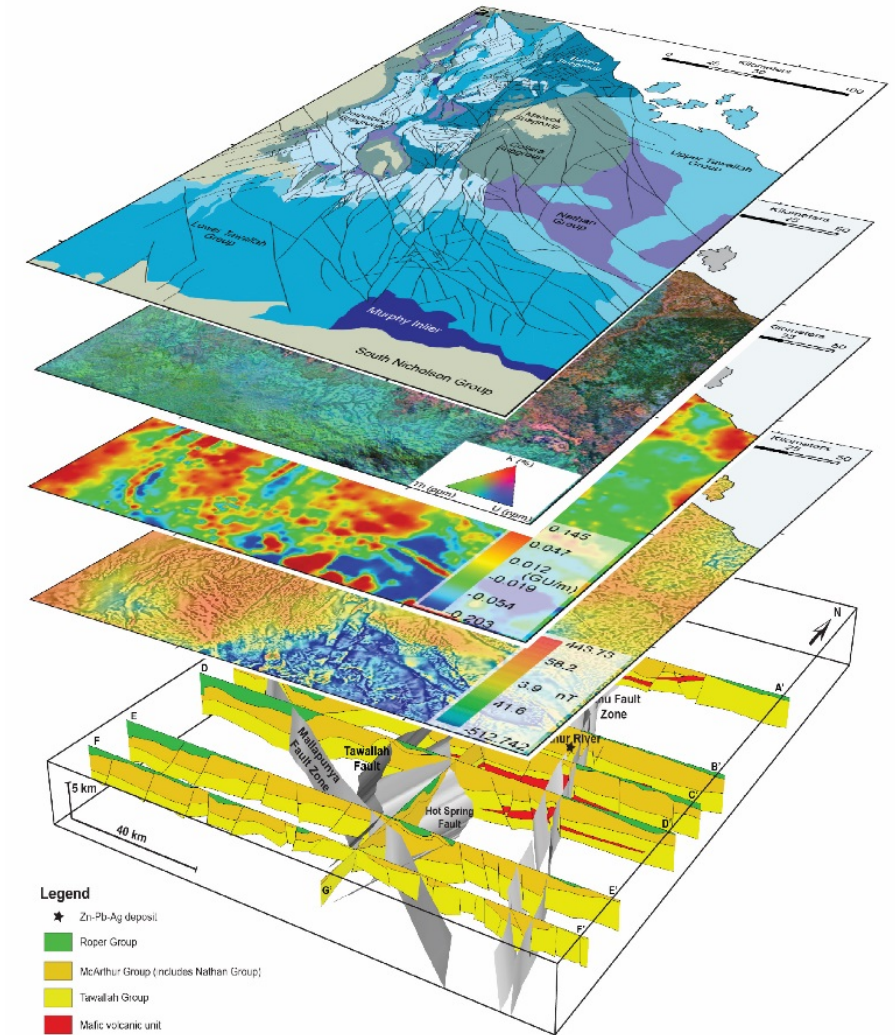
Plan to extend
over entire NT

CSIRO-NTGS study on McArthur Basin

- Gravity acquisition by NTGS, reprocessing and stitching of multiple industry AEM surveys
- Solid geology and structural interpretation of geophysical data
- 2D forward modelling of high-resolution gravity profiles
- Carbon isotope and sequence stratigraphic assessment of McArthur Group
- Deformation-fluid-flow modelling
- Integration of results with geodynamic framework of northern Australian basin systems

To be released as NTGS Record during 2019

Embedded CSIRO researchers: Teagan Blaikie, Marcus Kunzmann

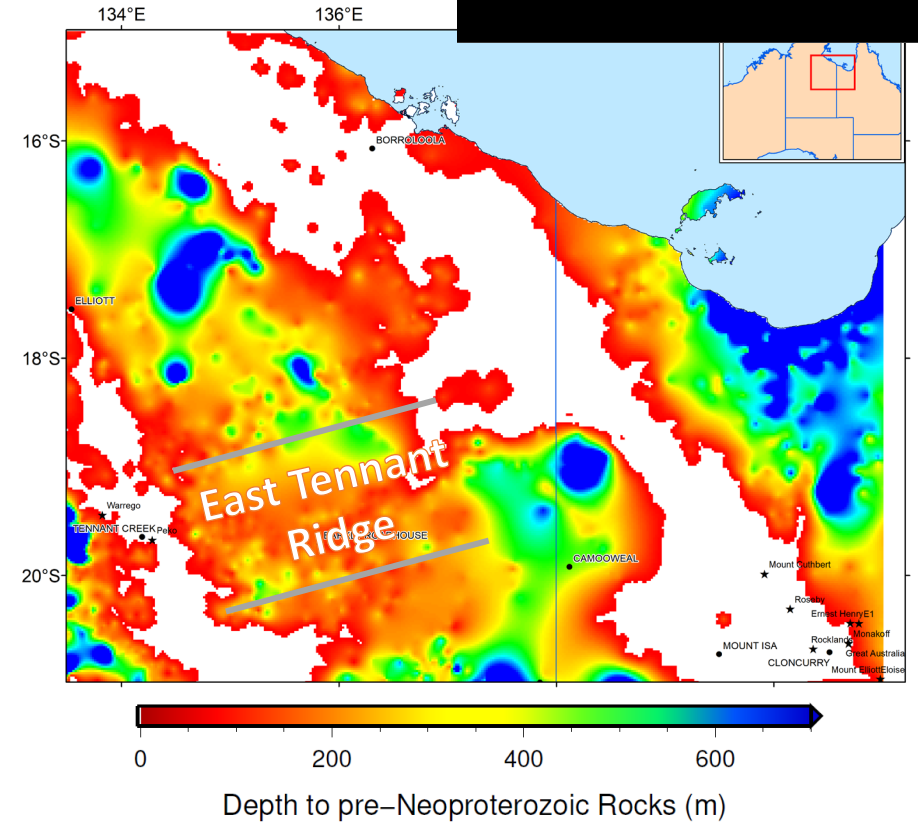
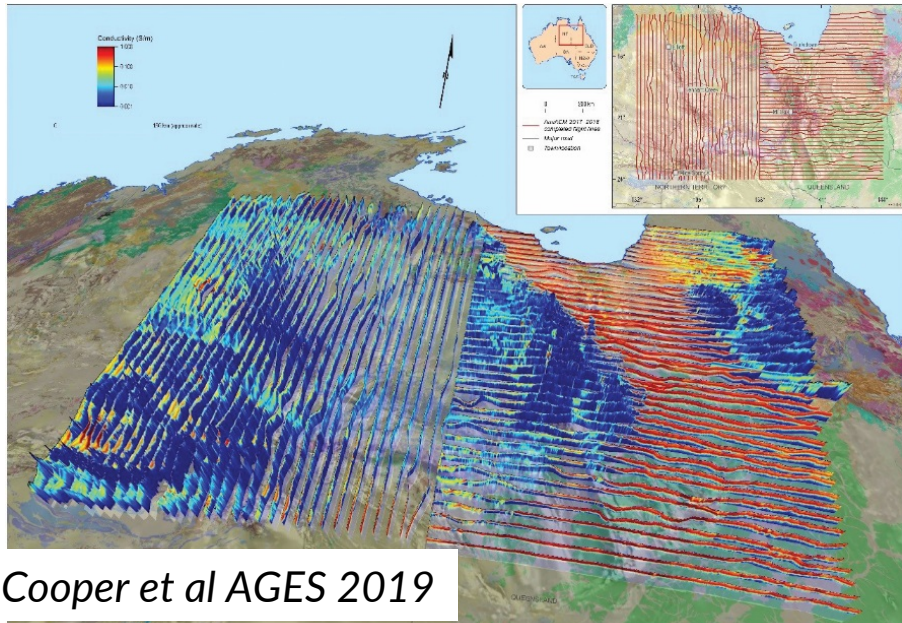


Exploring for the Future in the Barkly region

(NTGS co-investing and collaborating)

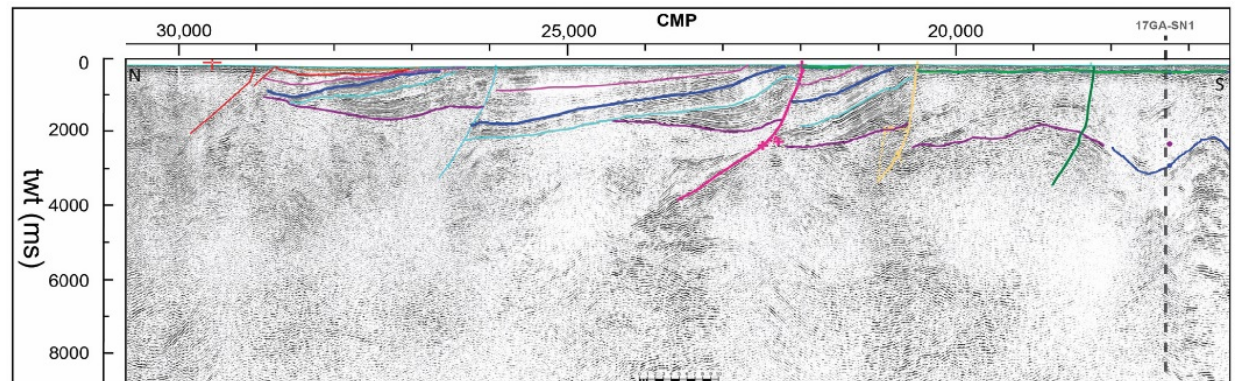


- Unprecedented level of new geoscience data at outcrop to lithospheric scale
- NTGS mapping South Nicholson and Lawn Hill in NT
- Potential for undercover mineral province east of Tennant Ck



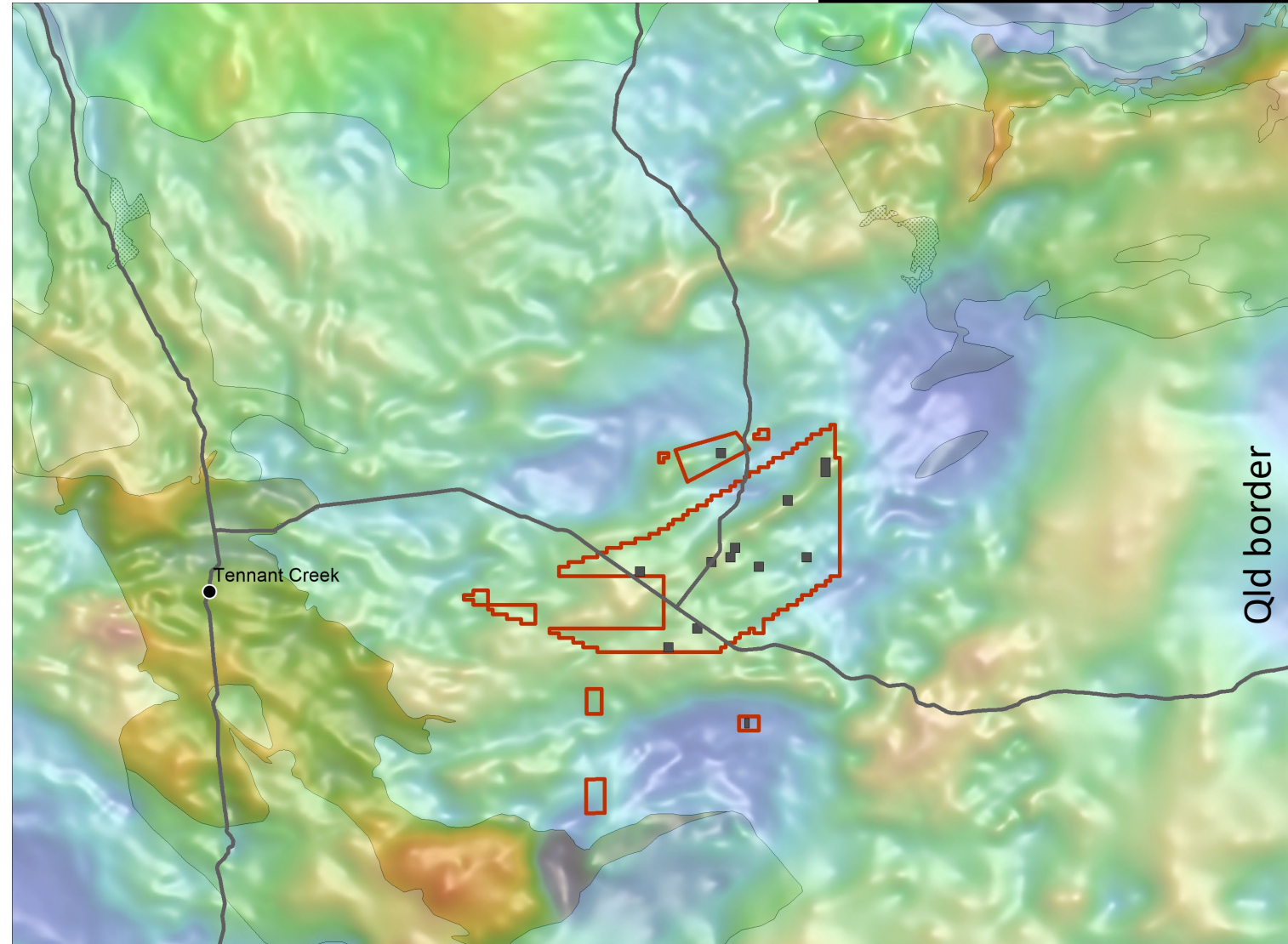
South Nicholson seismic

Carr et al AGES 2019



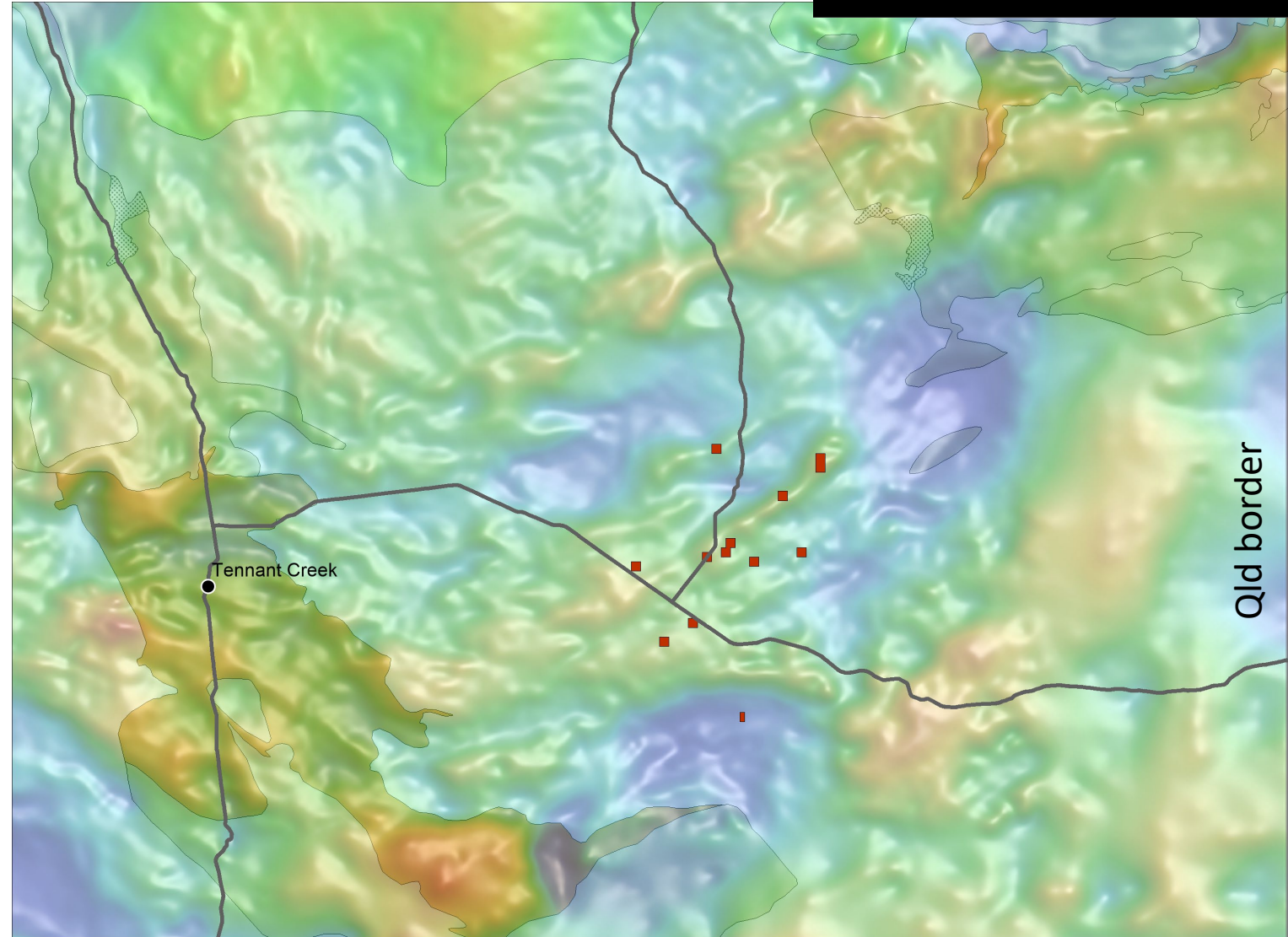
New exploration opportunity in Barkly region

- East Tennant “No Applications Allowed” status will be lifted 07 October 2019
- 12 smaller areas will remain as “No Applications Allowed” to allow further drilling to be undertaken under MinEx CRC National Drilling Initiative
- Applications must be received by 4pm on 7 October
- Areas can be viewed on STRIKE
- Applications in conflict will be assessed and awarded to applicant with the superior work program and expenditure
- Remaining ‘No Applications Allowed’ areas will be lifted upon completion of drilling program



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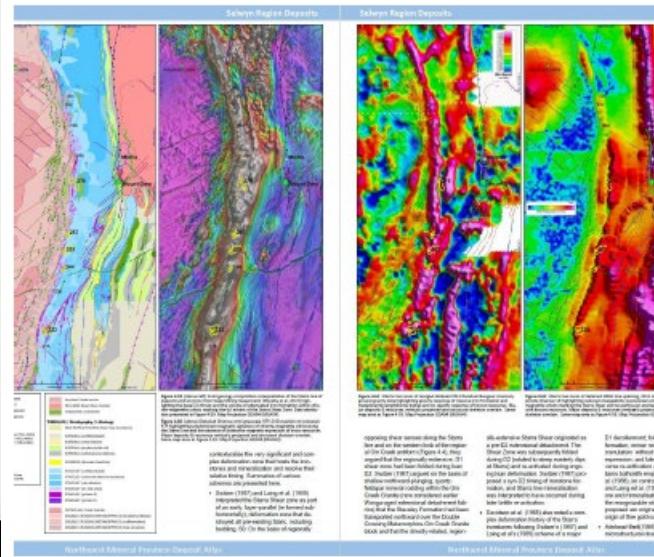
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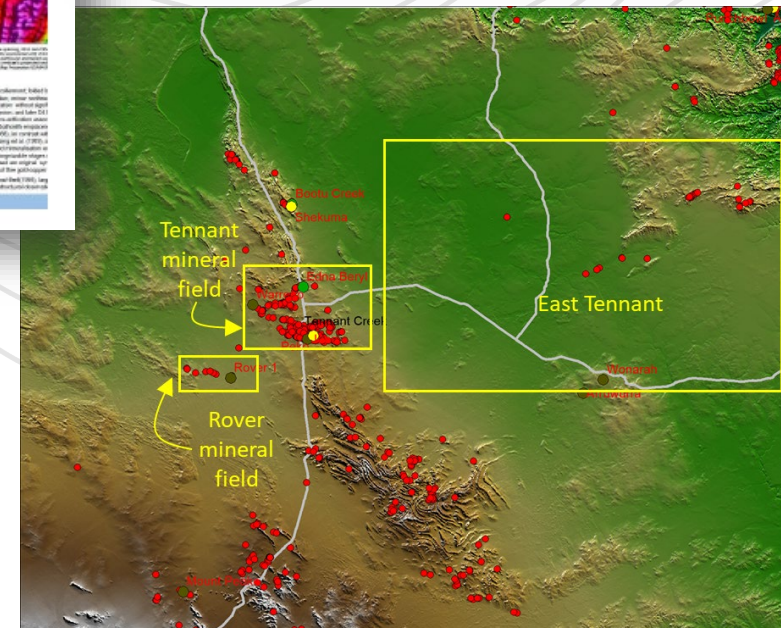
Planned activity in Tennant and Rover mineral fields

- Complete capture of all historic drilling and geochemistry data over region (in progress)
- Univ of Qld to produce mineral atlas for all major deposits, 3D visualisation products, exploration toolkit
- New data to improve the understanding of the below surface geology and base metal mineral systems in Rover field - collaboration with GA

- Compilations
- Analysis



Exploration Toolkits

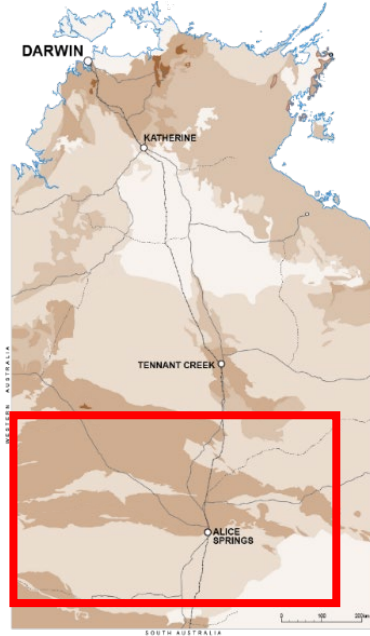


NTGS RECORD 2019-001

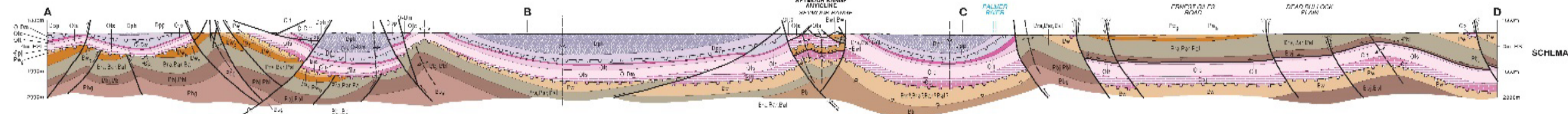
Using tourmaline to identify base metal and tungsten mineralising processes in the Jervois mineral field and Bonya Hills, Aileron Province



MV McGloin, A Weisheit, RB Trumbull and R Maas



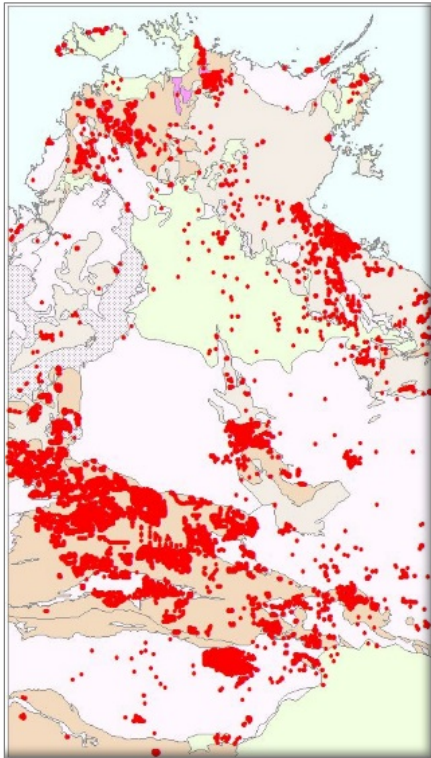
- Focus on **Amadeus Basin** and **Aileron Province**
- Fundamental mapping, stratigraphic characterisation and geological framework
- Mineral systems of Aileron Province
 - ❖ Syngenetic deposits (1825-1780 Ma) – typically associated with mafic/bimodal magmatism and exhalites in clastic sediments
 - ❖ Recent discoveries (Grapple; Hendrix) - transgressive massive sulphide breccias that appear epigenetic (or remobilised syngenetic)
- Amadeus Basin: focus on Neoproterozoic stratigraphy and 3D basin architecture



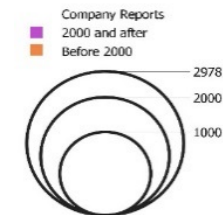
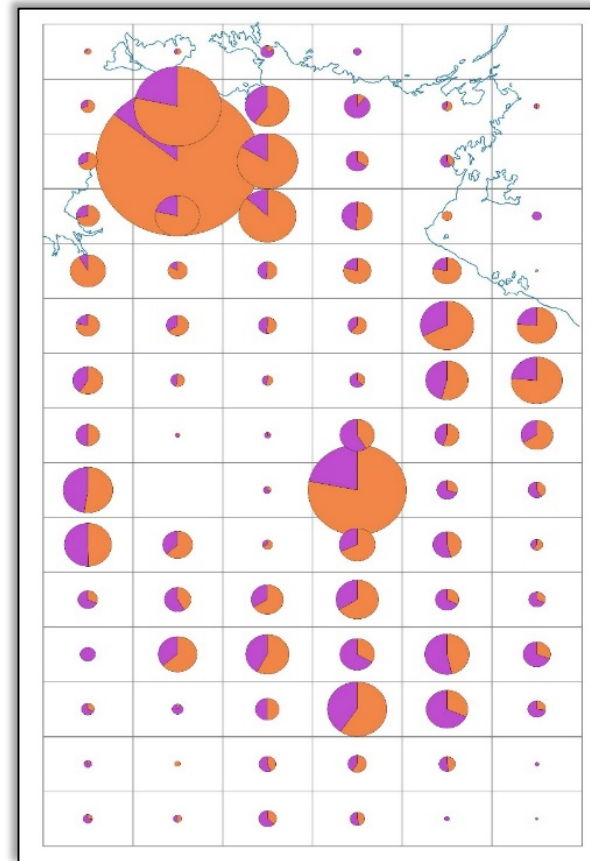
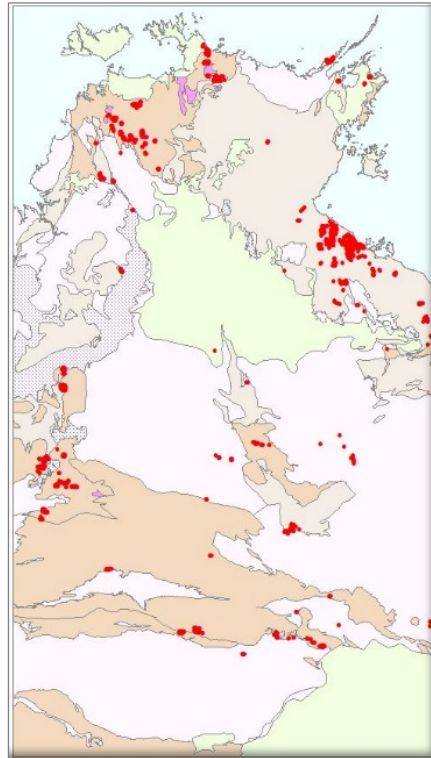
- Major campaign to upgrade NT-wide drilling and geochemistry datasets
- Ongoing input of incoming data, plus major legacy data capture
- Commenced in Batten Fault Zone, moving to Tennant Creek, then remainder of Barkly

DRILL HOLES

>152,000 total



>15,000 new



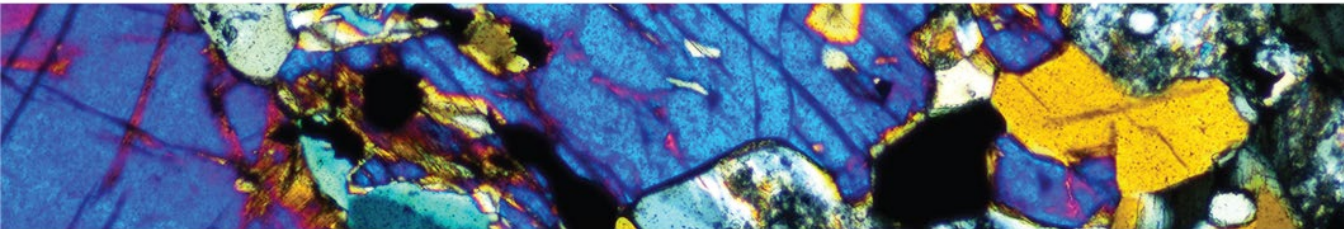
Promoting the Territory's resource potential

**RESOURCING
THE TERRITORY**

NORTHERN TERRITORY GEOLOGICAL SURVEY
AGES2020

ANNUAL GEOSCIENCE EXPLORATION SEMINAR
Alice Springs, 24–25 March 2020, Northern Territory

The Territory's premier exploration-focused event



Summary

RESOURCING THE TERRITORY

- Exploration in the NT is rebounding strongly, driven by gold, base metals and lithium
- NTGS is has a diverse range of geoscience programs in progress to stimulate exploration in the NT through the *Resourcing the Territory* initiative.
- In combination with *Exploring for the Future* program this is the biggest campaign of collaborative pre-competitive geoscience in the Territory's history

