New developments in geoscience and exploration in the NT

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Mining the Territory 5 September 2019
NT mineral exploration expenditure 2001-2019
Annual expenditure calculated quarterly

- 2003 - $41.5M
- 2011 - $228.4M
- 2016/17 - $78.4M
- 2018/19 - $131.9M
Gold producers with strong cash flow investing in NT exploration
Greenfields exploration hotspots in the Territory

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
Gold in the Pine Creek region

Kirkland Lake Gold - Cosmo
- Underground development and exploration at Lantern
- Multiple rigs drilling at Cosmo, Union Reefs and Pine Creek
- NoI 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
Gold in the Tanami

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

**Northern Star Resources:**
- Substantial footprint in the Tanami
- 18,600m aircore drilling on CTP in H1 2019

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

**Prodigy Gold:**
- Aggressive greenfields exploration at *Capstan* and *Galaxy*
- Upgraded resource for *Suplejack*
Gold in the Tennant Creek region

- **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
Polymetallic mineralisation in the Aileron Province

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

- 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
Upgrading the Territory’s coverage of geophysical data

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
Upgrading the Territory’s coverage of geophysical data

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
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

Mount Peake-Crawford airborne magnetic and radiometric survey (2019)
Unlocking the resource potential of the Barkly and Gulf regions

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

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
Unlocking the resource potential of the Barkly and Gulf regions

*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

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**South Nicholson seismic**  
*Carr et al AGES 2019*

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**Ley Cooper et al AGES 2019**
Unlocking the resource potential of the Barkly and Gulf regions

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
Unlocking the resource potential of the Barkly and Gulf regions

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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
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

Stimulating greenfields exploration in central Australia
Making exploration and geoscience data more accessible

- 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

NORTHERN TERRITORY GEOLOGICAL SURVEY
AGES 2020
ANNUAL GEOSCIENCE EXPLORATION SEMINAR
Alice Springs, 24–25 March 2020, Northern Territory

The Territory’s premier exploration-focused event
• 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