Raising the profile –
GSNSW highlights of 2019
Contents

- A renewed licence to operate
- MinEx CRC
- Cooperative Drilling round 3
- Priorities for 2020
A renewed licence to operate
Following the NSW state election in March

• Hon. John Barilaro, Deputy Premier, Minister for Regional New South Wales, Industry and Trade named as Minister responsible for resources.

• The Deputy Premier has been outspoken in his support for the mining industry as a major contributor to regional NSW economies and communities.
July 2019 Machinery of Government changes

- On 1 July 2019, the former Department of Industry and Department of Planning and Environment were effectively merged to create the **Department of Planning, Industry and Environment**.

- The Division of Resources and Geoscience, including GSNSW, was placed in the Regions, Industry, Agriculture and Resources Group.

| Coordinator General  
| Regions, Industry, Agriculture & Resources  
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<th>Gary Barnes</th>
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| Director General  
| Primary Industries  
| Scott Hansen |
| Drought Coordinator  
| Jock Laurie* |
| Chief Executive  
| Local Land Services  
| David Witherdin |
| Cross-Broder Commissioner  
| James McTavish* |
| Deputy Secretary  
| Regional NSW  
| A/ Rebecca Fox |
| Chief Planner  
| Gary White |
| Deputy Secretary  
| Resources & Geoscience  
| Michael Wright |
| Director Inclusive Infrastructure & Experience  
| Paul Nunnari |
| Chief Executive Regional Growth NSW Dev’pt Corp  
| Brendan Nelson |
Uncovering the home of the richest lode

MINING VISION FOR LAKE
The NSW mineral discovery challenge
The NSW mineral discovery challenge

- NSW’s known metal occurrences and deposits occur almost exclusively in areas where prospective basement is at or near-surface.
The NSW mineral discovery challenge

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- Mineral exploration has also focussed almost exclusively on these areas.
The NSW mineral discovery challenge

- NSW’s known metal occurrences and deposits occur almost exclusively in areas where prospective basement is at or near-surface.
- Mineral exploration has also focussed almost exclusively on these areas.
- Explorers need new tools and new data to give them the confidence to explore in covered terranes.
MinEx CRC overview
MinEx CRC: 2018–2028

- $218 million, 10 year investment in mineral exploration R&D
  - $41 million cash contribution from ‘industry’ partners
  - $127 million in-kind contribution from ‘industry’ partners and research participants
  - $50 million cash contribution from Commonwealth Government Department of Industry, Innovation and Science CRC Program.

- 36 organisations involved, including:
  - major miners, juniors and METS providers
  - all Australian geological surveys (4 participants, 4 affiliates)
  - CSIRO, AuScope and 7 Australian universities.

The world’s largest mineral exploration collaboration.
Three programs

• Program 1 – Improved drilling efficiency
  • Developing more productive, safer and environmentally friendly drilling methods to discover and drill-out deposits, including coiled tubing drilling technology.

• Program 2 – Real-time data collection and analysis
  • Developing new technologies for collecting data while drilling, bringing forward mine production.

• Program 3 – National Drilling Initiative (NDI)
  • A world-first collaboration of Geological Surveys, researchers and industry that will undertake drilling in under-explored areas of potential mineral wealth in Australia.

• Plus Education and Training – PhD/MSc/Hons/VET

GSNSW involvement
NDI: a national collaboration

- **Participants**
  - GSNSW
  - GSSA
  - GSWA
  - GA

- **Affiliates**
  - GSV
  - MRT
  - NTGS
  - GSQ

- **Research Participants**
  - CSIRO
  - UoA
  - Uni SA
  - Curtin
  - UoN
  - UNSW
  - ANU
GSNSW strategy for MinEx CRC
National Drilling Initiative in NSW

• Focus for GSNSW will be on pre-competitive data acquisition including drilling in five areas.

• These areas are undercover extensions to known mineralised terranes.

• GSNSW will assess legacy materials and data, and undertake targeted mapping, and geochemical and geophysical surveys prior to drilling.

• The data collected will also provide information on potential groundwater resources in the areas (collaboration with NSW Office of Water, GA, UoN, others).
GSNSW NDI commitment – $15.9 million

- **$4.4 million cash**, to be invested in drilling in NSW
  - Based on first pass grid costing.

- **$11.5 million in-kind**
  - **$3.5 million new geophysics** (AEM, mag/rad, gravity).
  - **$0.6 million analytical costs** (hydrogeochem, biogeochem, geochem, geochron, mineralogy).
  - **$5.0 million staff in-kind**.
  - **$2.4 million depreciated value of existing data**.

- Through MinEx CRC, this investment will leverage significant additional research.
Three phases – key activities

- Pre-drilling phase
  - audit and gaps of legacy materials and data
  - geophysics acquisition and modelling
  - mapping, logging, sampling, analysis, geochron
  - biogeochemistry, hydrogeochemistry.
- Drilling phase
  - data handling, computation
  - analysis (e.g. HyLogger™, isotopic).
- Post-drilling phase
  - interpretation and 3D modelling.
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| North and South Cobar         | Siluro-Devonian basins, Ordovician basement.                                     | Late Devonian and possible Mesozoic basins, Cenozoic regolith        | Cobar style polymetallic, Besshi-style volcanic-hosted massive sulfides, possible magmatic systems. | 1. Map the geology under cover, particularly key horizons.  
2. Understand the geodynamic history – including thermal history, basin architecture, fill, deformation.  
3. Understand controls and timing of mineralisation.  
2. Geophysics: AEM, infill gravity, magnetics and radiometrics.  
3. Improve existing mapping, including geochronology.  
232 holes  
14,685 m |
| Mundi                         | Willyama Supergroup, ~1590 Ma igneous rocks, key Neoproterozoic horizons.       | Neoproterozoic to Devonian basins, Mesozoic Eromanga Basin, Quaternary Eyer Basin, Cenozoic regolith. | Broken Hill type Pb-Zn-Ag, iron oxide Cu-Au, Mississippi Valley type Pb-Zn, unconformity U possible magmatic systems. | 1. Map the geology under cover, including characterisation of key time slices and interfaces.  
2. Understand the expression of basement geology and mineral systems in cover.  
3. Correlate basement geology between NSW and SA.  
4. Understand cause and effects of the Mundi MT conductivity anomaly.  
5. Extend Curnamona mineral potential mapping under cover. | 1. Resampling of legacy materials.  
2. Geophysics: AEM, infill gravity, magnetotellurics.  
3. Improve existing mapping, including geochronology.  
4. Soil, bio- and hydro-geochemistry. | 2024  
65 holes  
14,844 m |
| Forbes                        | Macquarie Igneous Province (MIP), Siluro-Devonian basins and igneous rocks.      | Late Devonian basins, possible Mesozoic Great Australian Basin, Cenozoic regolith. | Porphyry Cu-Au, epithermal systems, volcanic-hosted massive sulfides, orogenic gold, possible magmatic systems. | 1. Map the geology under cover, including phases of the MIP.  
2. Understand the expression of basement geology and mineral systems in cover.  
3. Understanding of the geodynamic history, e.g. structural controls, magmatic history, Siluro-Devonian basin fill, deformation.  
4. Ordovician mineral chemistry to differentiate alteration vs metamorphism, | 1. Resampling of legacy materials.  
2. Geophysics: AEM, infill gravity, magnetotellurics.  
3. Improve existing mapping, including geochronology.  
4. Bio- and hydrogeochemistry. | 2025  
233 holes  
22,735 m |
| Dubbo                         | Macquarie Igneous Province (MIP), Siluro-Devonian basins and igneous rocks.      | Permo-Triassic Sydney Basin, Mesozoic Surat Basin and volcanic rocks, Cenozoic regolith and volcanic rocks. | Porphyry Cu-Au, epithermal systems, volcanic-hosted massive sulfides, orogenic gold, possible magmatic systems. | 1. Map the geology under cover, including characterisation of key time slices/interfaces.  
2. Understand the expression of basement geology and mineral systems in cover.  
3. Identification, location and nature of MIP under cover.  
2. Geophysics: AEM, infill gravity, possible magnetotellurics.  
3. Improve existing mapping, including geochronology.  
4. Bio- and hydro-geochemistry. | 2026  
234 holes  
17,172 m |
Activities to date
Audit and gaps

- Report for each of the five focus NDI areas.
- Includes previous mapping, geophysics, geochronology, palaeontology, field observations, geochemistry etc.
- Inform work program and research opportunities for each NDI area.
- Underway, will be published by end of 2019.
- Examples from Mundi NDI report, by Chris Folkes
Initial focus on Cobar

- Northern and southern extensions of the Cobar Basin under cover, up to a depth of 500 m.
- Long history of mining, with limited current mine life.
- Recent advances in understanding from GSNSW mineral systems work.
- Exploration interest and significant potential for discovery.
- Community support for mineral exploration and mining.
Cobar community consultation

Cobar to Lake Cargelligo ahead of AEM and hydrogeochemistry

- Community leader meetings (February 2019)
- Community information sessions (April 2019)
Cobar hydrogeochemistry

- GSNSW now has two kits and is trained up
  - Thanks Nathan Reid, Rob Thorne (CSIRO).
- Designed to test:
  - different aquifers & geology
  - calibration with AEM.
- Two trips sampled 86 sites
  - 16 geochronology.
Cobar AEM

- Collaborative acquisition with Geoscience Australia
  - 12/09/19 to 19/10/19 – acquisition by NRG.
- Data conductivity depth inversions (the coloured sections for interpretation) have been delivered to GSNSW and GA.
- End March 2020 – processed layered inversions from GA.
- Proposed PhD to undertake detailed interpretations and modelling.
- CSIRO research work.
Cobar biogeochemistry

Joe Schifano PhD project (UNSW) in the greater Cobar region:

- Cypress pine trees are the target plant
- Common in the region and have deep root systems
- >2000 samples collected
- ~ 50 elements analysed
- Initial results indicate potential to map covered geology, including direct indications of mineralisation.
Cobar timeline

- Q4 2018: EOI MAA / EL process consultation
- Q1 2019: Waterbore sampling
- Q2 2019: Audit and gaps
- Q3 2019: AEM acquisition
- Q4 2019: Mag/Rad acquisition, Gravity acquisition
- 2020: Drilling (South Cobar)
- 2021: Drilling (North Cobar)
- 2022:
- 2023:

- Communications strategy signed
- Industry consultation
- Meet community leaders
- Participants agreement signed
- Community workshop
MinEx CRC MAAs
MinEx CRC MAAs

- Gazetted on 10 August 2018
  - Combined area represents 2.59% of NSW.

- No new Group 1 ELAs within MAAs without Ministerial consent.

- **NO IMPACT ON EXISTING ELs/ELAs.**

- Constituted to allow open discussion of NSW MinEx CRC NDI program, without the risk of speculative exploration title applications and land banking.

- GSNSW has worked with the industry to develop an agreed process for grant of Group 1 ELs within the MAAs.
Expression of interest process

- Opened on Friday 16 August, and closed on Monday 30 September 2019.
- Seven applications received, none of which overlap.
  - These have been progressed to ED RO for approval.
MinEx CRC: Expanding the frontiers of mineral exploration in NSW
The UNCOVER imperative

- The future of the Australian mineral industry hinges on its ability to successfully explore the 70% of the continent that lies undercover.
- To do this the industry needs new tools, technologies and data.
- Just as geological surveys mapped the surface geology to provide a framework for mineral explorers in the 20th century, we need to map the undercover geology to create a framework for 21st century mineral discovery. **Mapping with a drill rig.**
- MinEx CRC NDI is a significant first step on that path.
- 10 years is just the start of a long road.
Outcome of the NDI in NSW

Improved understanding of the basement geology and its expression in cover sequences across five areas of the state …

… supporting development of new tools and methodologies for successful exploration undercover…

… to open up vast new frontiers for explorers, generating a wave of discoveries that will underpin a strong mineral industry and economy for future generations of Australians.
Cooperative Drilling round 3
Cooperative Drilling round 3

- 50% of direct per metre drilling costs up to a maximum of $200,000 per program.
  - Maximise coverage and benefit.
  - Simplicity.
- Launched by the Deputy Premier at IMARC in his speech on 29 October 2019.
- Invitation to Apply open until 31 December 2019.
- Assessment by joint industry–GSNSW panel and announcement of successful applicants in early 2020.
Assessment criteria

• How does the proposed work program advance exploration in previously underexplored areas (35%)?
• How does the proposed work program test sound geological models, or innovative concepts and ideas (30%)?
• How does the work undertaken to date define the target(s) to be tested (25%)?
• Details of proposed work program and data to be acquired (10%)?

Priorities for 2020
2020 priority projects
Chris Yeats
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