

WESTERN AUSTRALIA

Exciting discoveries continue to be made in a huge State (over 2.5 million km²)

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Pilgangoora: Production has commenced, with 22 375 dry metric tonnes of spodumene concentrate produced in May 2019. A Pre-feasibility Study has been initiated to expand production up to 7.5 Mtpa, including up to 1.2 Mtpa at approximately 6% spodumene concentrate and 5% tantalite concentrate. (Pilbara Minerals Ltd)

Iron Bridge: Environmental approval has been sought to develop the **Iron Bridge** magnetite project. The 5.45 billion tonnes resource includes a reserve of 716 Mt at 67% Fe, 5.62% SiO₂ and 0.29% Al₂O₃. Annual production is estimated at 20 Mtpa (dry) over at least a 20-year mine life. Ore is to be processed onsite into a saleable concentrate product before being pumped to Port Hedland via a slurry pipeline. (FMG Magnetite Pty Ltd / Formosa Steel IB Pty Ltd)

Mining Area C / South Flank: BHP Group continues mine development at **South Flank** with initial ore production planned for 2021 at 80 Mtpa for 25 years. (BHP Group Ltd / ITOCHU Minerals and Energy of Australia Pty Ltd / Mitsui Iron Ore Corporation Pty)

Eramurra Industrial Salt Project: A Pre-feasibility Study has been completed based on 2.2 Mtpa production of chemical salt. Export is proposed from **Cape Preston East** to the Asian market. A Feasibility Study is planned, aiming for production in 2025. (Leichardt Industrials Pty Ltd)

Mardie: Pre-feasibility Study plus Optimization Study has concluded with the estimated salt production increasing from 3.5 Mtpa to 4.0 Mtpa and SOP production increasing from 75 ktpa to 100 ktpa. The operating life has also increased from 30 to 60 years with exports to go through an onsite port. A Definitive Feasibility Study is expected in late 2019. (BCI Minerals Ltd)

Butcherbird: Project resource estimate has increased by 34% to 263 Mt at 10% Mn (contained 26.3 Mt Mn). **Yanneri Ridge** resource was upgraded to 105 Mt at 10.1% Mn. A Pre-feasibility Study is well advanced and the project is due for completion in 2019. (Element 25 Ltd)

Lake Way: Commercial-scale SOP evaporation has commenced in the lead up to commissioning a processing plant in Q4 2020. Annual production of 200 kt of premium-grade SOP (>52% K₂O) is anticipated over a project life of 20 years. The project has a resource estimate (drainable) of 8.2 Mt and 73 Mt (Total Porosity) SOP. A Bankable Feasibility Study is due for completion in Q3 2019. (Salt Lake Potash Ltd / Blackham Resources Ltd)

Kathleen Valley: Drilling results include intercepts of 90 m at 1.3% Li₂O and 83 m at 1.5% Li₂O from 223 m. These latest assays are outside the conceptual openpit and could substantially increase the existing maiden resource estimate of 21.2 Mt at 1.4% Li₂O and 170 ppm Ta₂O₅. An updated resource estimate is due for release in July 2019 and a Pre-feasibility Study is anticipated in Q4 2019. (Liontown Resources Ltd)

Gabanintha: The mineral resource estimate has been increased to 131 Mt at 0.9% V₂O₅ and 10.1% TiO₂, including a high-grade component of 71.2 Mt at 1.1% V₂O₅ and 12.7% TiO₂. A Definitive Feasibility Study is to be completed in mid-2019. (Technology Metals Ltd)

Australian Vanadium Project: Pilot-scale studies are underway following the completion of metallurgical and resource drilling. A 2021 production start date from a proposed openpit operation could produce 0.9 Mtpa of 1.4% V₂O₅ magnetite concentrate, with an on-site V₂O₅ refinery producing 10 ktpa V₂O₅ flake product over an estimated 17-year mine life. The maiden ore reserve is 18.24 Mt at 1.04% V₂O₅ from a total project resource of 183.6 Mt at 0.76% V₂O₅. (Australian Vanadium Ltd)

Weld Range Complex: Resources have been upgraded for **Parks Reef** to 15.7 Mt at 1.39 g/t PGE+Au and an additional 4.7 Mt at 0.24% Cu and 0.13g/t Au. Further drilling is planned to quantify the resources accessible via a shallow openpit mining operation. (Podium Minerals Ltd)

Iron Ridge: The resource estimate has increased for the **Iron Ridge** Fe ore project to 9.2 Mt at 64.1% Fe, 3.36% SiO₂, 2.66% Al₂O₃ and 0.045% P. Further infill drilling and metallurgical testing has commenced with a Feasibility Study for the high-grade DSO hematite project due in December 2019. (Fenix Resources Ltd)

Coburn: Project reserve has increased by 70% to 523 Mt at 1.11% total HM (contained ~5.8 Mt HM). A Definitive Feasibility Study has confirmed the updated reserve underpins an initial mine life of 22.5 years at 23.4 Mtpa. (Strandline Resources Ltd)

Barrambie: Neometals has revised the Definitive Feasibility Study based on producing high-purity V, primarily from the **Barrambie Central Band ore**. The total project resource is 280.1 Mt at 0.44% V₂O₅ and the reserve is 39.9 Mt at 0.78% V₂O₅. Next step is pilot-scale metallurgical testwork to develop the best processes to recover Ti, V and Fe. (Neometals Ltd)

Windimurra: Recommencement of operations is planned for mid-2019. The **Windimurra** plant has been proposed to process up to 4.5 Mtpa of ore, to produce a maximum of 10 515 tpa V₂O₅. (Atlantic Pty Ltd)

Cadoux: Development of a pilot plant for high-purity Al (HPA) has been announced as part of a Bankable Feasibility Study of the **Cadoux** Kaolin project. Completion of the pilot plant is expected in late Q2 2019. The reserve estimate for the project is 2.8 Mt at 24.4% Al₂O₃ over a 25-year mine life. (FYI Resources Ltd)

Cataby: The **Cataby** mine was officially opened in June 2019 by the Hon. Mark McGowan MLA after production commenced this year. Mining is expected to continue for up to 13 years with an average annual production of 200 kt of synthetic rutile (from 370 kt of ilmenite), 50 kt of zircon and 30 kt of rutile. Synthetic rutile is processed at Iluka's operations at **Capel**, while rutile and zircon is separated from heavy mineral concentrate at **Narngulu** mineral separation plant in Geraldton. (Iluka Resources Ltd)

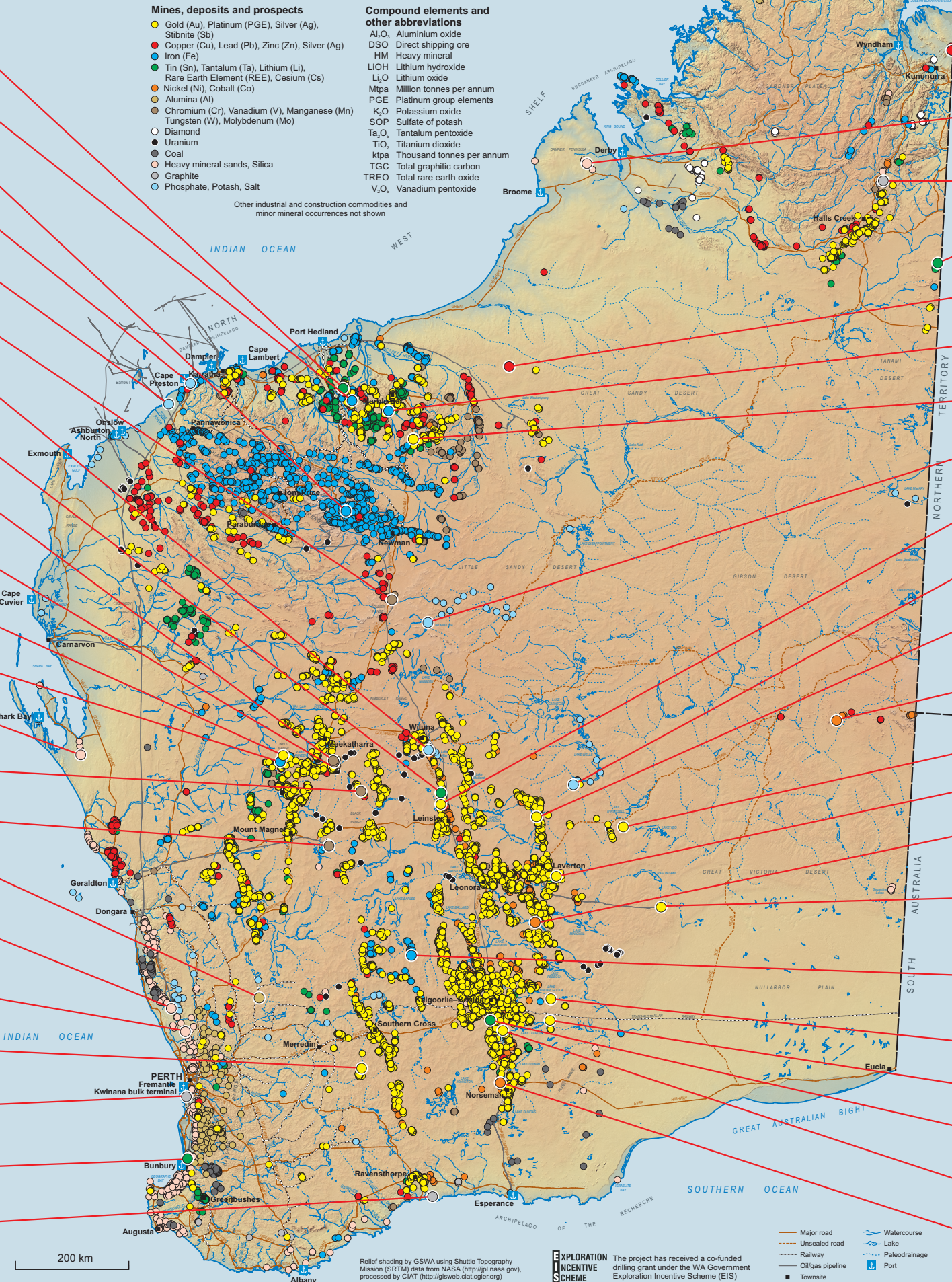
Boonanarring: Since commencing production in 2018, ore feed grades are up to 2.5 times higher than expected (19% HM, compared to 7.4% HM). A zone of ultra-high-grade ore has been stockpiled for potential shipment as DSO. Exports continue, with a second (~20 kt) and third shipment (~18 kt) of HM concentrate in February and March 2019. (Image Resources NL)

Edna May – Weston: Underground mine development at **Edna May** continues, with stoping to commence in FY 2020. Anticipated Au production is 550 000 oz pa, potentially including ore from **Edna May** underground, **Marda**, **Tampia**, **Symes Find** and **Greenfinch**. The total project resource estimate is 33.19 Mt at 0.9 g/t Au. (Ramelius Resources Ltd)

Kwinana EcoGraf: Kibarian Resources continues towards establishing a battery graphite production facility at Kwinana, with the completion of further development studies in June. Initial plant production is forecast at 5 ktpa of battery-grade graphite, ramping up to 20 ktpa. Graphite will be sourced from a range of overseas suppliers. A final investment decision on the project is anticipated in 2020. (Kibaran Resources Ltd)

Kemerton Lithium Hydroxide Conversion Plant: Construction continues after the official opening by the Hon. Mark McGowan MLA in April. Spodumene concentrate containing 6% Li₂O will be processed from **Greenbushes**. First production of 20 ktpa is planned for 2020, ramping up to 100 ktpa by 2025, over an operating life of 25 years. (Albemarle Corporation)

Springdale: Two new, high-grade graphite horizons have been drilled, results include 6 m at 26.5% TGC. These results are outside the current mineral resource estimates of 15.6 Mt at 6% TGC. Comet Resources is planning further drilling to upgrade and expand the project resource estimate. (Comet Resources Ltd)



Sorby Hills: Mineral resource estimate and Pre-feasibility Study was completed with a 123% increase in the Indicated resource to 10.85 Mt of 5.0% Pb equivalent (3.9% Pb, 46 g/t Ag) and 0.4% Zn. Further drilling is underway as the company progresses the project towards a Definitive Feasibility Study in late 2019. (Pacífico Minerals Ltd / Henan Yuguang Gold & Lead Company Ltd)

Thunderbird: A maiden Inferred resource of 130 Mt at 3.3% HM has been announced for **Night Train**, located 20 km south of **Thunderbird**. An updated Bankable Feasibility Study for the **Thunderbird** project is expected to be finalized during Q3 2019 and production set for 2021. **Thunderbird** has a total mineral resource of 3.23 billion tonnes at 6.9% HM, including 18.6 Mt of zircon, 5.9 Mt of high-Ti leucocene, 6.5 Mt of leucocene and 61.7 Mt of ilmenite. (Sheffield Resources Ltd)

McIntosh: Total resource estimate of 23.8 Mt at 4.5% TGC has been upgraded, with 81% of the resource now classified as Indicated. This includes a 42% increase in Indicated resources, and overall 12% increase in contained graphite. A Feasibility Study for the project is due in November 2019 before commercial production is expected to begin in May 2021. (Mineral Resources Ltd / Hexagon Resources Ltd)

Browns Range: Maiden Inferred resource for the **Dazzler** deposit has been estimated at 144 kt at 2.23% TREO containing 3 200 000 kg TREO. This is more than triple the average grade for the **Browns Range** project. The pilot plant produced 28 068 kg of rare earth carbonate in Q1 2019, and the feasibility of a full-scale operation continues to be assessed. (Northern Minerals Ltd)

Winu: Rio Tinto announced the discovery of vein-style Cu–Au–Ag mineralization at **Winu**, within the Yeneena Basin, of the Paterson Province. Results include 60 m at 1.03% Cu, 1.22 g/t Au and 4.30 g/t Ag. (Rio Tinto Ltd)

Corunna Downs: Atlas Iron Pty Ltd is seeking environmental approval to develop the **Corunna Downs** project. Approximately 5 Mtpa of Fe ore is proposed to be mined over six years. Ore will be trucked to the Run of Mine pad for crushing and screening with the final product to be exported from Port Hedland. Site construction is estimated to commence in Q4 2020, with mining expected in Q2 2021 and shipping by Q3 2021. (Atlas Iron Pty Ltd)

Beatons Creek: The **Beatons Creek** alluvial Au project resource estimate increased by 30% to a total Indicated resource of 6.6 Mt at 2.1 g/t Au, and Inferred resource of 4.3 Mt at 3.2% Au. An options study for this and related projects is due in Q3 2019. (Novo Resources Corporation)

Beyondie: The Hon. Stephen Dawson MLC has approved the **Beyondie** SOP project. The project remains on schedule to commence SOP production in 2020, with an estimated initial mine life of 30 years (up to 50 years) with an annual SOP production of 100 kt. (Kalium Lakes Ltd)

Bellevue: An Exploration Incentive Scheme (EIS) funded deep drillhole intersected a new mineralized shear in the footwall of the **Bellevue** deposit. Mineralization including visible Au was intersected at a 1.5 m interval 150 m below the existing underground mine. Another new zone was discovered west of the **Tiburne Lode**, with results including 4.0 m at 8.3 g/t Au. Current resources for the **Bellevue** project are estimated at 1.53 million oz. (Bellevue Gold Ltd)

Lake Wells: Construction of trial evaporation ponds at the **Lake Wells** potash project has been completed. This follows development of two high-yield production bores from depths up to 175 m. This work will contribute to the reserve estimate pending the Definitive Feasibility Study. The project resource estimate is 14.7 Mt of SOP. (Australian Potash Ltd)

Duketon: Development of the **Rosemont** decline commenced in February 2019. Underground production is predicted to start in March 2020, at a modelled rate of 480–600 ktpa for 4.8 years from three underground zones — **Rosemont South**, **Rosemont Central** and **Rosemont Main**. The current underground resource estimate increased by 37% to 1.7 Mt at 5.6 g/t Au, and a maiden ore reserve estimate of 0.6 Mt at 6.4 g/t Au was released. (Regis Resources Ltd)

West Musgrave: Drilling results at **One Tree Hill** prospect include 9.0 m at 2.56% Cu, 0.37% Ni, 0.06% Co and 1.32 g/t PGE and; 6.2 m at 3.61% Cu, 0.11% Ni, 0.03% Co and 0.51 g/t PGE. Exploration is ongoing as the prospect is assessed as a satellite deposit to **Nebo-Babel**. The **Babel** resource estimate has increased to an Indicated resource of 108 Mt at 0.33% Ni, 0.38% Cu, 0.06 ppm Au, 120 ppm Pd and 0.09 ppm Pt. A Pre-feasibility Study is underway, based on a mining rate of at least 10 Mtpa over an initial mine life of eight years. (Oz Minerals Ltd / Cassini Resources Ltd)

Yamarna-Gruyere: First Au poured in July 2019. Final plant commissioning is ongoing, with commercial production rates expected later this year. The project aims for annual production of 300 000 oz pa for 12 years from a resource of 155 Mt at 1.32 g/t Au. (Gold Road Resources Ltd / Gold Fields Ltd)

Karridale: Total mineral resource has increased by 25% to 15.7 Mt at 1.3 g/t Au for 672 000 oz. (Focus Minerals Ltd)

Coronation Dam: A maiden Inferred resource of 5.7 Mt at 1.0% Ni and 0.08% Co, containing 56 700 t of Ni and 4300 t of Co has been announced. This is in addition to the **Ghan Well** maiden Inferred mineral resource of 1.3 Mt at 0.9% Ni and 0.07% Co. These deposits located in the same region, are also close to existing mine infrastructure. (White Cliff Minerals Ltd)

Tropicana: Development of the **Boston Shaker Underground** mine project was approved following completion of a Feasibility Study. Construction will begin in June 2019, with production expected in August 2020. Ore from this development will enable **Tropicana** production to be maintained at 450 000–500 000 oz pa over the next five years. The **Boston Shaker Underground** resource estimate is 12.5 Mt at 4.2 g/t Au, and the total **Tropicana** project resource estimate is 136.3 Mt at 1.76 g/t Au. (AngloGold Ashanti Ltd / Independence Group NL)

Lake Giles: A favourable preliminary economic assessment for a 2.4–3.4 Mtpa operation incorporating both the **Ularring Hematite** and **Moonshine Magnetite** deposits to produce a high-grade blended concentrate has been announced. The hematite mineral resource includes approximately 54.46 Mt at 47.2% Fe (Indicated) and 25.99 Mt at 45.4% Fe (Inferred). The magnetite mineral resources for the **Moonshine** and **Moonshine North** deposits are approximately 710 Mt at 30.2% Fe. A total 82.8 Mt of saleable tonnes is estimated over the 31-year project life, to be exported from the Port of Esperance. (Macarthur Minerals Ltd)

Lake Roe: **Tura** lode has been discovered 420 m below the **Bombora** deposit. Results for **Tura** include 21 m at 5.74 g/t Au. An update on the 24.6 Mt at 1.4 g/t Au project resource estimate is expected in mid-2019. A Pre-feasibility Study for openpit mining will be completed later in 2019. (Breaker Resources NL)

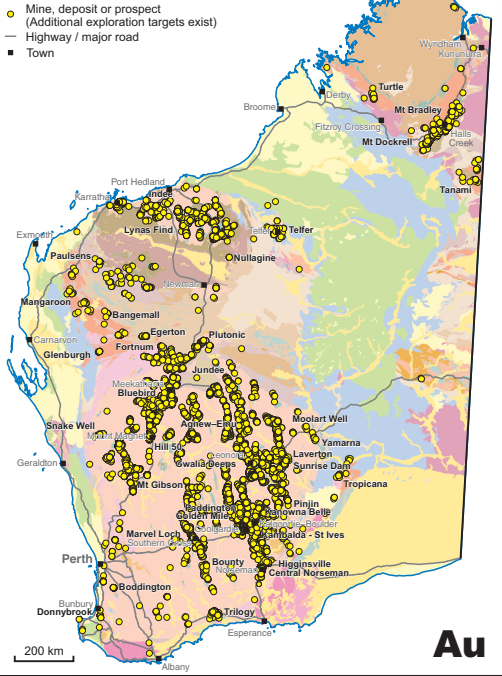
Aldiss: High-grade intersections at **Tank South** confirm a new discovery on the **SAT Trend**. Drilling at **Tank South** returned the best result for the **Aldiss** project to date — 17 m at 24.7 g/t Au. (Silver Lake Resources Ltd)

Mt Marion: An upgrade of the **Mt Marion** plant was completed during March 2019 and the plant is scheduled to ramp up to 450 ktpa by mid-2019. Spodumene concentrate will increase to 6% lithium from 4%. A total of 111 287 wet metric tonnes of spodumene was shipped during the March quarter. (Mineral Resources Ltd / Gangfeng Lithium Company Ltd)

Kambalda Gold: Another high-grade Au zone was discovered at **Beta Hunt** below mining at the **Father's Day Vein** (discovered in 2018). The resource estimate for the **Western Flanks** zone was also upgraded to 960 oz contained Au, confirming a 1.2 km along-strike continuation for this zone. The total resource estimate for **Beta Hunt** is 1.9 million oz contained Au. (RNC Minerals)

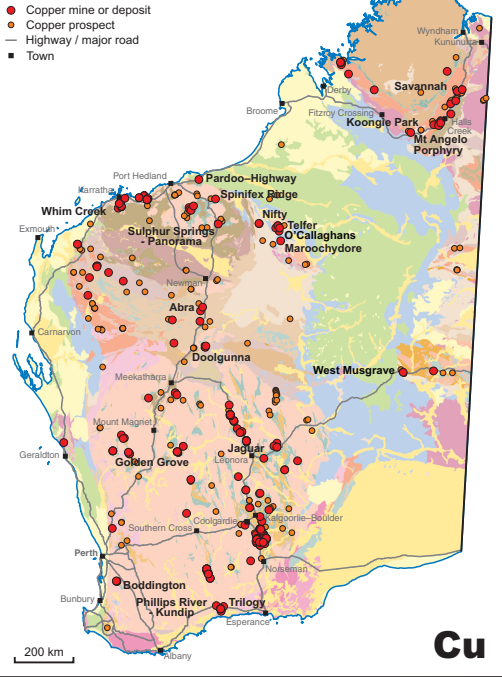
Mt Thirsty: Maiden Inferred mineral resource estimate was updated, increasing the project resource to 26.6 Mt at 0.113% Co and 0.52% Ni. The JV partners are progressing towards a Pre-feasibility Study. (Barra Resources Ltd / Conico Ltd)

Mines, deposits and prospects



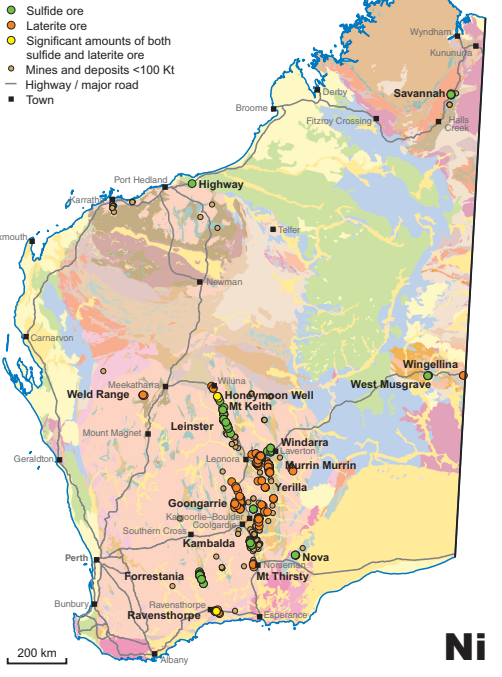
Au

Mines, deposits and prospects



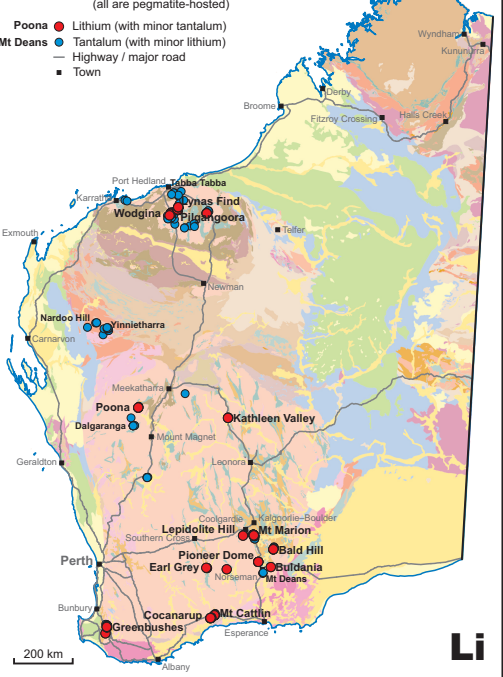
Cu

Mines and deposits



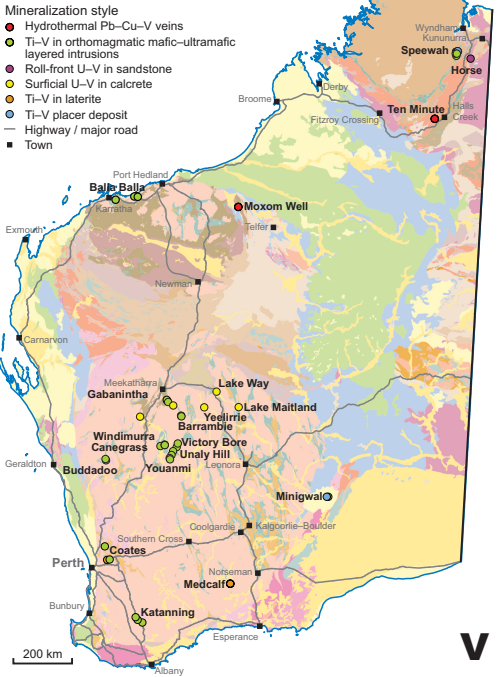
Ni

Mines, deposits and prospects



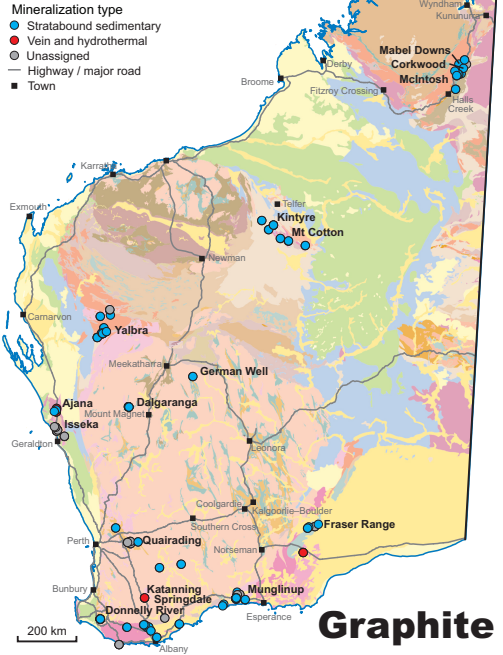
Li

Deposits and prospects



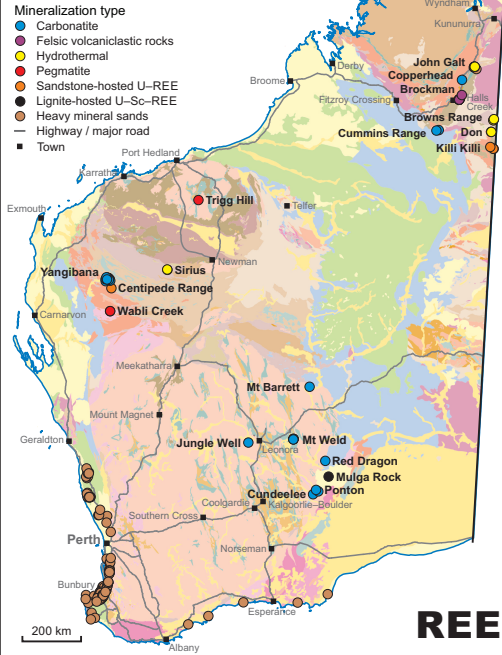
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Mines, deposits, prospects and occurrences



Graphite

Mines, deposits, prospects and occurrences



REE

WESTERN AUSTRALIA

Geoscience and resource information

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- Transparent licence system where all licence information can be viewed by anyone

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Free download of Mining Act and Regulations from www.slp.wa.gov.au

This site also has current copies of all other WA legislation

- Titles are for 'all' minerals
- First in time application system
- Security of tenure when moving from exploration to mining title
- Mining title can be granted at pre-feasibility stage
- Annual exploration expenditure commitments
- Annual 'rental' fee for licence
- Annual reporting of activities

Exploration licences

- Graticular system used based on a 'block' that is 1 minute of latitude x 1 minute of longitude
- Maximum number of blocks:
 - in greenfields areas: 200
 - in non-greenfields areas: 70
- If after five years the licence is extended, 40% of the area must be surrendered

Mining lease applications

There are two ways to submit applications

- 'Mining proposal' involving environmental assessment before grant; or
- Mineralisation Report and Supporting Statement, or Resource Report and Supporting Statement. Mining proposal and environmental assessment submitted for approval at later date

Very large projects (e.g. iron ore, diamonds, alumina) may involve a Special Agreement with the State Government

THE WORLD'S PREMIER MINING STATE

Fees, securities and minimum expenditures

July 2019	Maximum area	Term	Application fee	Rent	Security	Minimum annual expenditure*
Prospecting Licence	200 ha	4 years (then 4-year extension)	\$356	\$2.90 per ha Min: \$29	\$5k each	\$40 per ha Min: \$2k
Special Prospecting Licence for Gold	10 ha (maximum)	Min 3 months (then 3-month extension up to 4 years)	\$356	\$29	\$5k each	\$2k
Exploration Licence	70 blocks normally (200 blocks in greenfield areas)	5 years (then 2-year extension)	1 Block \$375 > 1 Block \$1502	Per block Years 1-3 \$138 Years 4-5 \$233 Years 6-7 \$318 Years 8+ \$601	\$5k each	# Years 1-3 ≤ 20 blocks Min: \$10k-20k > 20 blocks \$1k per block
Mining Lease Minerals Dissolved in Brine	Not applicable	21 years renewable	N/A	# Years 1-5 \$2.32 per ha	\$5k each	\$100 per ha Min: \$5k if <5 ha otherwise \$10k
Mining Lease	Not applicable	21 years renewable	\$525	\$19.80 per ha	\$5k each	\$100 per ha Min: \$5k if <5 ha otherwise \$10k
General Purpose Lease	10 ha or larger with Minister's approval (for tailings dams, processing plants)	21 years renewable	\$525	\$17.50 per ha	\$5k each	Covenant in lieu
Miscellaneous Licence	Not applicable (for power lines, roads)	21 years renewable	\$525	\$17.50 per ha	\$5k each	Covenant in lieu

www.dmp.wa.gov.au/Minerals/Mining-acts-fees-and-charges-16494.aspx

* includes rent payments

ha = hectare (100 x 100 m)

Block = 3 km² approx.

Examples of royalty rates

The full list of royalty rates is in Regulation 86 of the Mining Regulations, 1981 or the relevant State Agreement

Limestone (construction)	\$0.73 per tonne
Limestone (metallurgical)	\$1.17 per tonne
Coal	7.5% if exported
Bauxite	7.5%
Copper	5% (concentrate); 2.5% (metal)
Nickel in concentrate	\$ royalty = 2.5 x D x f / 100 D: % Ni in concentrate f: Ni metal price per tonne
Iron ore (DSO)	7.5%
Gold	2.5% of metal value
Zircon concentrate	5% of sales value

Tonnage-based rates Sales value-based rates

DSO = Direct Shipping Ore

JULY 2019

WA Department of Mines,
Industry Regulation and Safety
(the principal mineral industry regulator)
www.dmirs.wa.gov.au

Department of Jobs, Tourism, Science and Innovation
(coordinates the development of major resource
and infrastructure projects)
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Department of Foreign Affairs and Trade
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Australian Tax Office
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Austrade
(Australian Trade Commission)
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