

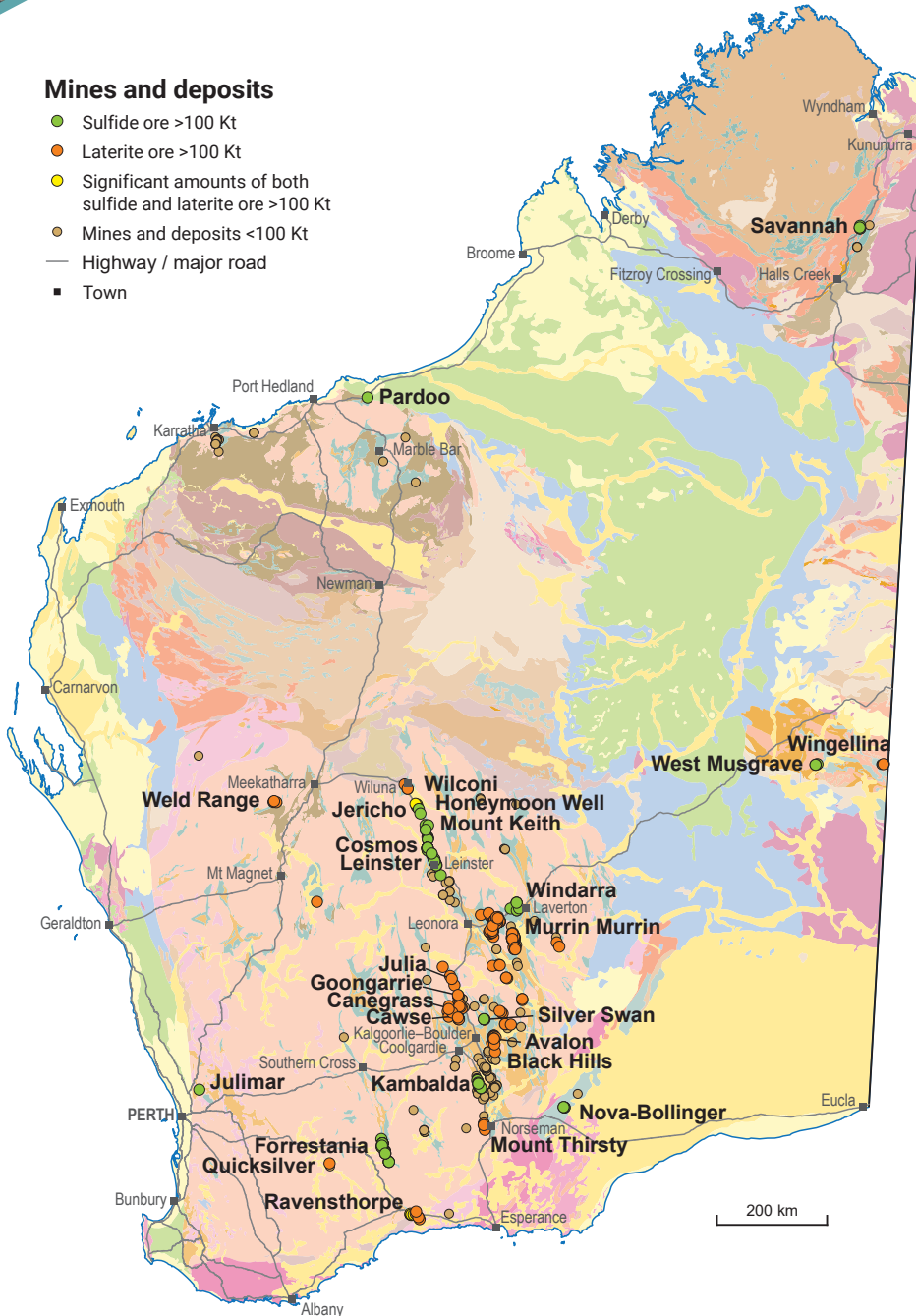
NICKEL-COBALT

INVESTMENT OPPORTUNITIES

WORLD-CLASS RESOURCE PROVINCE | SECURE INVESTMENT LOCATION
WORLD-LEADING GEOSCIENTIFIC DATA | GLOBAL MINING SERVICES INDUSTRY

Mines and deposits

- Sulfide ore >100 Kt
- Laterite ore >100 Kt
- Significant amounts of both sulfide and laterite ore >100 Kt
- Mines and deposits <100 Kt
- Highway / major road
- Town



Western Australia hosts world-class nickel deposits

- The Yilgarn Craton is Australia's premier nickel-producing region containing some of the world's largest nickel resources which are equivalent to almost 34 Mt of contained nickel
- Western Australia also ranked among the top five global producers for cobalt in 2019, with resources currently at 1.3 Mt of contained cobalt
- Production in 2019–20 was 153 516 t of nickel (metal and concentrate) from 49 operating mines
- The Murrin Murrin, Nova-Bollinger, Ravensthorpe and Savannah mines also produced cobalt as a byproduct from their nickel operations
- Anticipated demand for battery minerals has encouraged the reopening and development of new nickel mines, such as Cosmos (Western Areas), Ravensthorpe (First Quantum) and the Mt Keith Satellite project (Nickel West)
- Exploration continues across the State, with updated mineral resource assessments reported for Nebo-Babel (Oz Minerals Ltd / Cassini Resources), Mt Edwards (Neometals), Widgiemooltha (Mincor), Duketon (Duketon Mining) and a new discovery in the South West Yilgarn Craton at the Julimar prospect (Chalice Gold)
- The Mt Thirsty Cobalt Nickel project released a pre-feasibility study suggesting production of 19.1 kt of Co and 24.8 kt of Ni, from a mixed sulfide product could be sustained over a 12-year mine life from a Probable Ore Reserve of 18.8 Mt at 0.13% Co and 0.54% Ni

\$3145 m
Sales value



153 516 t
Tonnes sold



\$3940 m*
Exports



7558
Full-time
employees



\$2971 m*
Investment
projects



6th
Production
world ranking



(2019–20 calendar year)

* Includes projects planned, possible, committed or under construction as of September 2020



Government of Western Australia
Department of Mines, Industry Regulation and Safety

dmirs.wa.gov.au

Geological Survey of
Western Australia



Nickel projects with resources >150 Kt contained metal

Resources estimated according to JORC 2012

Project	Status	Owner	Resources (Mt)	Av. grade (% Ni)	Contained Ni (kt)	Av. grade (% Co)	Contained Co (t)	Resource date
Honeymoon Well*	Exploration	BHP Group (Nickel West)	524.4	0.76	4009			31/12/2014
Mt Keith ¹	Operating	BHP Group (Nickel West)	656.1	0.58	3834			30/06/2020
Weld Range	Pre-feasibility	EV Metals	385.3	0.64	2466	0.04	154 120	29/10/2013
Murrin Murrin	Operating	Glencore	237.0	1.00	2360	0.08	180 805	31/12/2019
Leinster	Operating	BHP Group (Nickel West)	238.5	0.90	2137			30/06/2020
Wingellina	Feasibility	Metals X	215.8	0.91	1952	0.07	151 087	30/06/2016
Ravensthorpe	Operating	First Quantum Minerals	307.3	0.58	1792	0.03	84 330	31/12/2017
Goongarrie	Pre-feasibility	Ardea Resources	215.0	0.71	1527	0.06	130 700	14/03/2018
Avalon*	Exploration	Wingstar Investments	169.8	0.83	1403			31/12/2012
Cawse*	Exploration	Wingstar Investments	176.5	0.69	1220			31/12/2013
West Musgrave	Pre-feasibility	Oz Minerals, Cassini Resources	341.0	0.33	1111	0.01	42 080	12/02/2020
NiWest	Pre-feasibility	GME Resources	85.1	1.03	878	0.07	55 320	30/06/2019
Cosmos	Operating	Western Areas	64.0	0.96	612			02/09/2020
Wilconi	Exploration	A-Cap Resources, Wiluna Mining Corporation	78.8	0.74	583	0.07	55 160	17/09/2019
Forrestania	Operating	Western Areas	19.2	1.86	356			30/06/2019
Nova-Bollinger	Exploration	IGO Limited	11.6	2.01	234	0.07	7964	30/01/2020
Savannah	Care and maintenance	Panoramic Resources	13.5	1.56	210	0.10	13 328	07/05/2020
Canegrass*	Exploration	Nickelore	29.6	0.71	209	0.06	17 760	27/11/2007
Silver Swan – Black Swan	Feasibility	Poseidon	30.9	0.63	195			30/06/2019
Julia*	Exploration	Wingstar Investments	25.9	0.74	193			31/10/2011
Black Hills*	Exploration	Western Resources, Zetek Resources	30.0	0.64	192	0.03	9000	18/09/2006
Jericho	Exploration	BHP Group (Nickel West)	31.0	0.59	183			30/06/2018
Quicksilver	Exploration	Golden Mile Resources	26.3	0.65	170	0.04	11 354	19/11/2018
Pardoo	Exploration	Caeneus Minerals	50.0	0.30	152	0.03	15 000	31/03/2010

* Resource estimates are not JORC 2012 compliant

¹ Includes Mt Keith Satellite project (Yakabindie)

Resource estimates have been rounded



Sulfide



Laterite



Laterite + sulfide

Nickel and cobalt prospectivity of Western Australia

- **Ultramafic rocks (komatiite and peridotite):** occur in Archean greenstone belts, mostly in the Yilgarn Craton. Examples include Kambalda, Mt Keith and Leinster. This mineralization style dominates historic production
- **Mafic-ultramafic intrusions:** (similar to Voisey's Bay in Canada, Bushveld Complex in South Africa and the Thomson mine in the Cape Smith belt of Canada): Archean examples occur in the Pilbara and Yilgarn Cratons. Proterozoic examples occur in the Fraser Range area (Albany-Fraser Orogen), Lamboo Province (Halls Creek Orogen) and in the Musgrave Province
- **Mafic intrusives related to Large Igneous Provinces (LIP):** similar to Noril'sk-style mineralization. Potential areas include dolerite sills in the Edmund, Collier, Officer, Kimberley, Speewah, and Hamersley Basins, as well as large areas of flood basalt in the east Kimberley
- **Lateritic deposits in regolith (residual and supergene):** developed over weathered mafic-ultramafic rocks of the Archean Yilgarn Craton and Proterozoic Musgrave Province (Wingellina)

For more information



Geological Survey of
Western Australia

www.dmirs.wa.gov.au/gswa

MINEDEX

www.dmirs.wa.gov.au/minedex

GeoVIEW.WA

www.dmirs.wa.gov.au/geoview

Contact us

Resource Investment Information

Geological Survey and Resource Strategy Division

Email: minerals.investors@dmirs.wa.gov.au

Tel: +61 8 9222 3676



Government of Western Australia
Department of Mines, Industry Regulation and Safety

September 2020

Geological Survey of
Western Australia

