

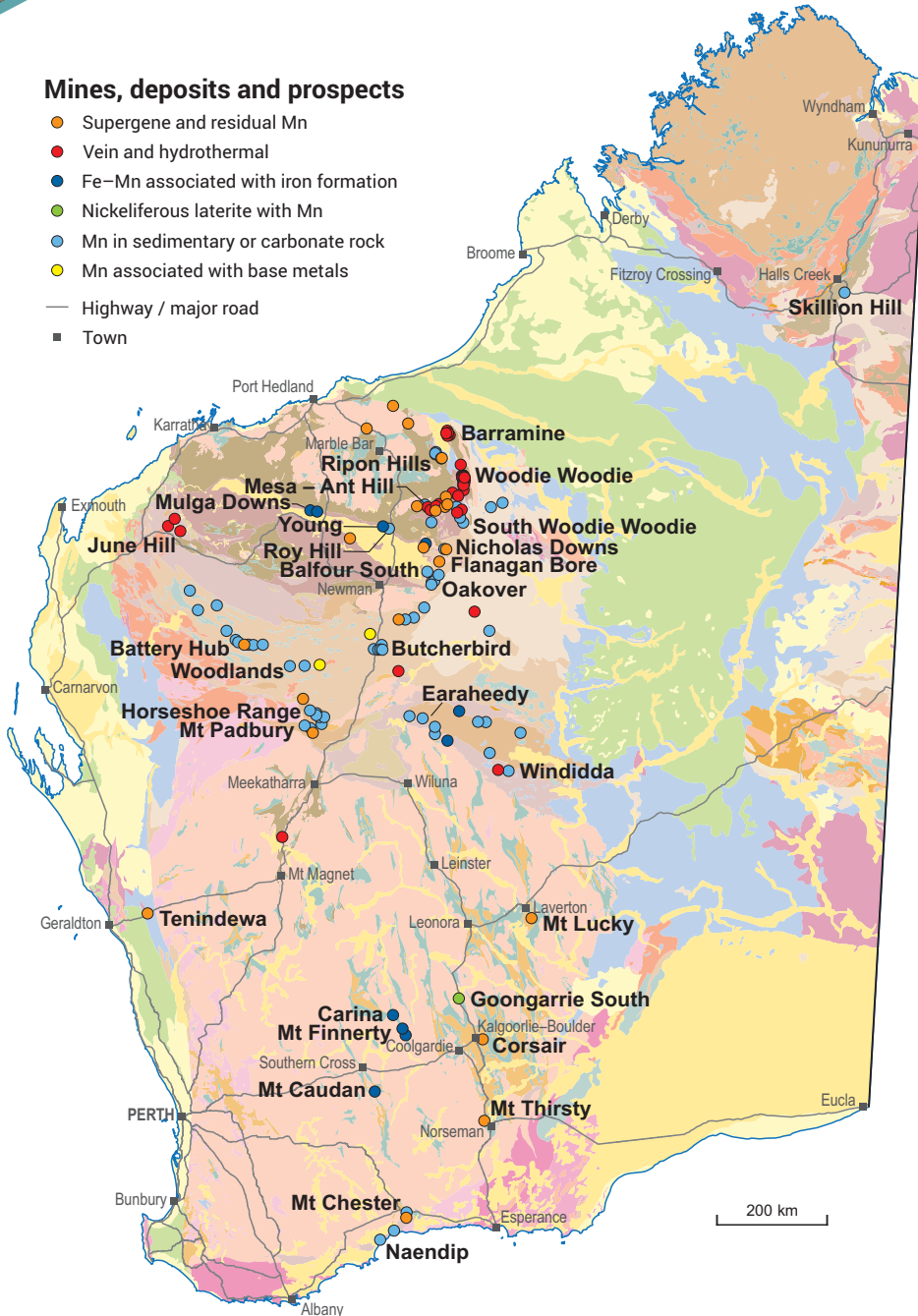
MANGANESE

INVESTMENT OPPORTUNITIES

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

Mines, deposits and prospects

- Supergene and residual Mn
- Vein and hydrothermal
- Fe–Mn associated with iron formation
- Nickeliferous laterite with Mn
- Mn in sedimentary or carbonate rock
- Mn associated with base metals
- Highway / major road
- Town



Western Australia's second manganese mine began operating in 2021

- The Butcherbird Project has shipped first commercial manganese concentrate (27 000 t) in July 2021 from the Utah Point facility at Port Hedland as part of its Stage 1 ramp-up. The project has an approximate 40- year mine life from a reserve of 50.5 Mt at 10.3% manganese, for use in the lithium-ion battery market
- The State has a long history of manganese mining, with a total of 14.8 Mt manganese ore produced since 1948. Woodie Woodie has been producing high-grade manganese since the 1950s
- Western Australian current Mineral Resources contain over 61 Mt of manganese, which is an essential alloy in the steel-making process

Recent exploration results

- High-grade manganese results were announced from ongoing exploration drilling at the Bryah Basin Project, including 4 m at 35% Mn and 2 m at 36.3% Mn
- Maiden Mineral Resource estimate announced for Flanagan Bore Project of 15 Mt at 11.3% Mn

467 660 t
Tonnes sold



9th
Production
world ranking



5–7.5%
Royalty
rate



\$31 m
Investment
projects



(2020–21 financial year)



Projects with manganese resources >9% Mn – ranked by contained manganese

Resources estimated according to JORC 2012

Project	Status	Owner	Resources (Mt)	Av. grade (% Mn)	Contained Mn (kt)	Resource date
Butcherbird	Operating	Element 25	262.8	9.94	26 130	16/04/2019
Woodie Woodie	Operating	Consolidated Minerals*	49.0	30.60	14 997	20/08/2019
Oakover	Scoping	Firebird Metals	64.0	10.03	6 418	08/06/2012
Balfour South	Proposed	Consolidated Minerals*	21.6	19.40	4 190	10/12/2018
Nicholas Downs [#]	Care and maintenance	Hancock Prospecting	8.8	23.70	2 094	28/02/2010
South Woodie Woodie	Proposed	Bardoc Gold / Planet Mining	14.2	13.33	1 898	14/03/2012
Flanagan Bore	Exploration	Black Canyon / Carrawine Resources	15.0	11.30	1 695	05/10/2021
Ant Hill – Sunday Hill	Care and maintenance	Resource Development Group	8.1	20.60	1 668	01/06/2021
Earaheedy	Exploration	Zenith Minerals	4.2	19.70	830	01/11/2017
Elsa Mary [#]	Proposed	Sinosteel Midwest	1.0	22.14	217	01/07/2009
Horseshoe Range	Scoping	Horseshoe Manganese	0.9	20.83	178	14/04/2011

Resource estimates have been rounded

* Parent – Ningxia Tianyuan Manganese Industry Co

[#] Resource estimates are not JORC 2012 compliant

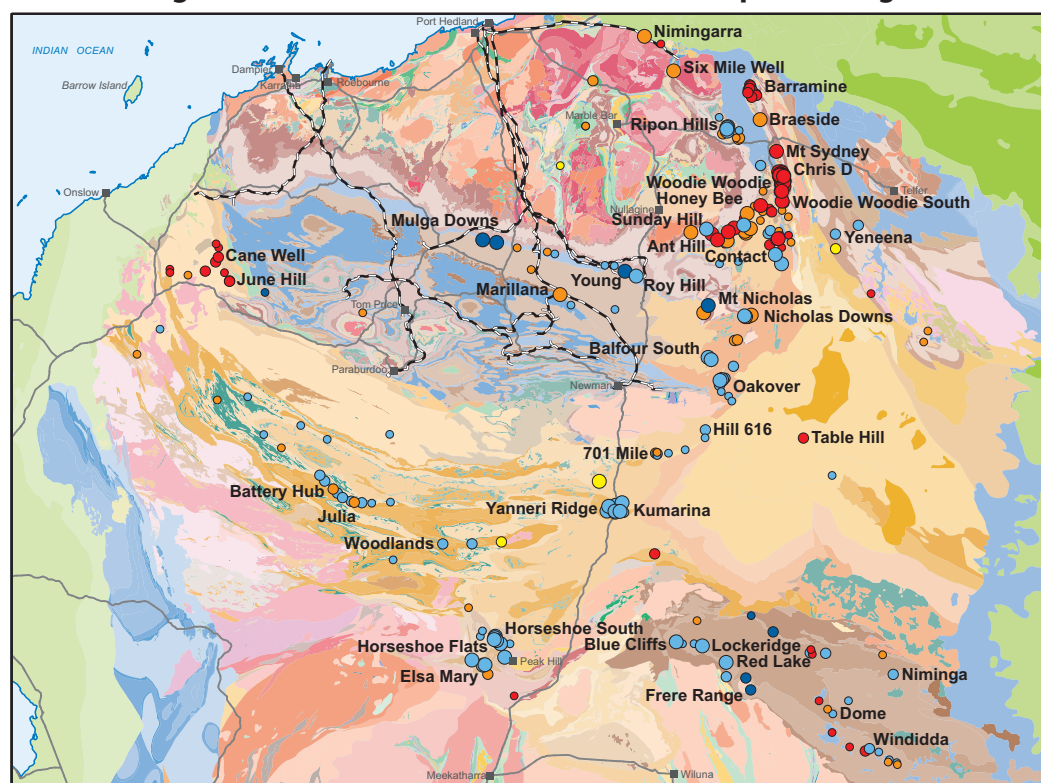
Supergene/residual Mn

Sedimentary or carbonate rock

Fe–Mn

Vein and hydrothermal

Manganese mineralization – Pilbara and Capricorn regions



- Supergene and residual Mn
- Hydrothermal Mn
- Fe–Mn associated with iron formation
- Sedimentary or carbonate hosted
- Mn associated with base metals
- Mine and deposit
- Prospect
- Occurrence
- Highway / major road
- Railway
- Town

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

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