

MANGANESE

INVESTMENT OPPORTUNITIES

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

Western Australia strengthens its position as a growing global force in manganese supply

- Western Australia has two operating manganese mines, Woodie Woodie and Butcherbird
- Current Mineral Resources in Western Australia are >110 Mt of contained manganese, an essential alloy in the steel-making process
- There is a growing demand from the electric vehicle industry as manganese is an important stabilizing component of battery cathodes
- Element 25 released an updated Feasibility Study for the Butcherbird Project in January 2025 with an updated Ore Reserve of 101.4 Mt at 10.4% Mn for 10.54 Mt contained manganese, underpinning the >18-year Life Of Mine operation. The project was awarded a US\$166 million (AU\$268 million) grant from the U.S. Department of Energy under the Battery Materials Processing Grant Programme. Element 25 Limited secured a senior debt finance facility of up to AU\$50 million from the Federal Government's Northern Australia Infrastructure Facility (NAIF) towards expansion of its Butcherbird Project
- Black Canyon carried out beneficiation testwork at the Wandanya Project. There was an improvement of the overall recovery of manganese to 80% producing 45% Mn concentrate grade. The results confirm expectations of increasing recovery at the expense of concentrate grade, but importantly still produces a high-grade manganese concentrate above the 44% Mn benchmark grade

Resource updates

- An updated Mineral Resource estimate was released for the Balfour Mineral Field (BMF) Project of 315 Mt at 10.5% Mn

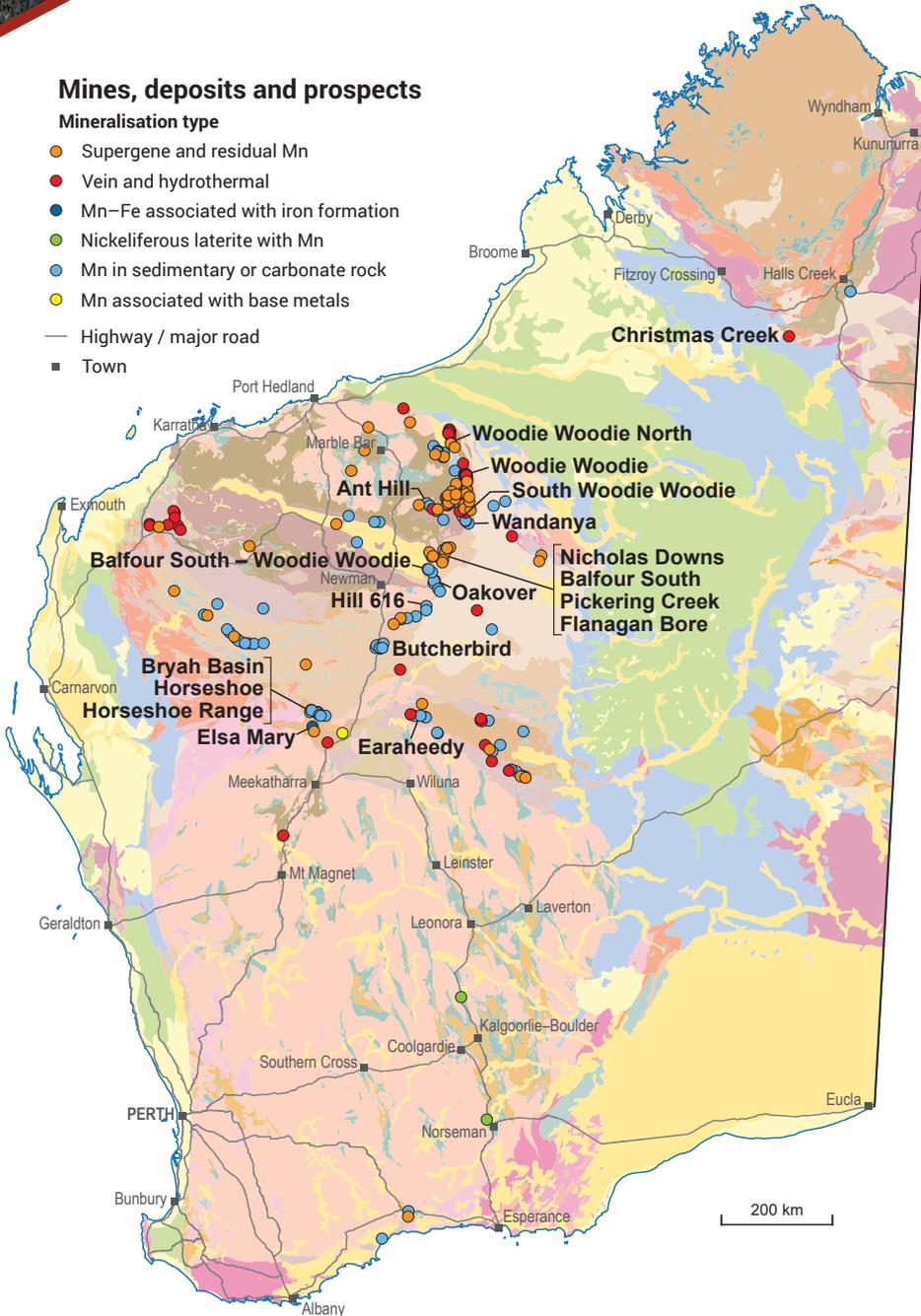
Exploration and discoveries

- High-grade manganese was identified at the Woodie Woodie North Project (Accelerate Resources) with up to 57.5% Mn reported from rock chip samples
- Trek Metals announced two high-grade manganese discoveries from rock chip samples. One at the South Woodie Woodie Project, with a peak result of 51.8% Mn, and one at the Christmas Creek Project representing a large hydrothermal manganese system, with a peak result of 60.1% Mn. The discovery at Christmas Creek represents a new manganese district within Western Australia
- Black Canyon announced a high-grade manganese and iron discovery at the Wandanya Project. Results for the manganese-rich discovery included 9 m at 34.7% Mn and 4 m at 50.4% Mn. The area remains open to the north and east and has a strike length of ~3-9 km

Mines, deposits and prospects

Mineralisation type

- Supergene and residual Mn
- Vein and hydrothermal
- Mn-Fe 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 manganese statistics data (2024–25 financial year)

\$409 m Sales value	553,097 t Tonnes sold	7th Production world ranking	\$272 m* Investment projects	5–7.5% Royalty rate

* Includes projects planned, possible, committed or under construction as of September 2025



Department of Mines,
Petroleum and Exploration

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Geological Survey of
Western Australia

Projects with manganese resources >9% Mn ranked by contained manganese as at January 2026

Mineral Resource Estimates reported in accordance with JORC (2012) unless otherwise stated

Project	Status	Owner	Resources (Mt)	Grade (% Mn)	Contained Mn (kt)	Resource date
Balfour Mineral Field [^]	Scoping	Black Canyon / Carawine	315.0	10.50	32 927	22/10/2025
Butcherbird*	Operating	Element 25	273.5	10.00	27 354	29/10/2024
Oakover	Scoping	Firebird Metals	176.7	9.87	17 432	23/03/2023
Woodie Woodie ¹	Operating	Consolidated Minerals*	47.8	31.79	15 185	23/03/2018
Hill 616	Exploration	Firebird Metals	57.4	12.25	7 030	01/12/2021
Balfour South – Woodie Woodie ^{1*}	Exploration	Consolidated Minerals*	21.6	19.40	4 190	10/12/2018
Ant Hill – Sunday Hill	Exploration	Mineral resources	13.6	17.94	2 437	20/11/2024
Nicholas Downs	Exploration	Hancock Prospecting	8.8	23.80	2 094	28/02/2016
South Woodie Woodie**	Exploration	Trek Metals / Planet Mining	11.3	14.95	1 690	14/03/2012
Earaheedy	Exploration	Zenith Minerals	4.0	20.04	802	30/04/2015
Bryah Basin	Exploration	Bryah Resources / OM Holdings	2.4	20.46	495	24/08/2023
Woodie Woodie North ²	Exploration	Accelerate Resources / First Development Resources	1.2	19.10	236	30/11/2023
Elsa Mary [†]	Exploration	Sinosteel Midwest	0.9	21.91	208	01/07/2009
Horseshoe Range [†]	Scoping	Esploratore	0.9	20.83	178	14/04/2011
Horseshoe	Exploration	Bryah Resources	0.6	19.96	129	03/03/2022

Resource estimates have been rounded

Mineral Resource is not JORC 2012 and not CRIRSCO compliant

† Mineral Resource is JORC 2004 compliant

* Parent – Ningxia Tianyuan Manganese Industry Co.

[^] Balfour Mineral Field comprises the Balfour South, Pickering Creek (100% Black Canyon) and Flanagan

Bore (75% Black Canyon, 25% Carawine) Projects

¹ Most recent open file resource from WAMEX

² Woodie Woodie North comprises the Braeside West and Barramine Projects

Spatial and resource estimate data sourced from WA Mines and Mineral Deposit database (MINEDEX)

 Supergene/residual Mn

 Sedimentary or carbonate rock

 Vein and hydrothermal

 Mn-Fe

Properties and uses

- Manganese is a metal that has important metal alloy uses, particularly in stainless steel
- Manganese has traditionally been used in steel manufacturing with manganese alloys added to prevent corrosion, resist abrasion, and increase hardenability. This consumes approximately 90% of the manganese produced globally. The balance is used in a number of different applications and products such as High Purity Manganese Sulfate Monohydrate (HPMSM), a critical raw material product used in the production of cathodes for lithium-ion batteries used in electric vehicles (EV). Other uses include, in dry cell batteries and as a black-brown pigment in paint. Steel contains 1% manganese to increase strength and improve workability. Manganese steel has 13% manganese which is very strong and used for railway tracks, rifle barrels, safes and prison bars
- High-purity manganese products are essential materials needed by the EU's fast-growing electric vehicle and lithium-ion battery industries. High-purity manganese (HPM) refers to a suite of highly refined finished products that are critical to most lithium-ion batteries. Its use and demand are increasing rapidly, particularly in Europe, China and the USA. The electric vehicle market has witnessed remarkable growth in recent years, driven by increasing environmental awareness, government incentives, and technological advancements. EVs are becoming an increasingly popular choice among consumers, leading to a surge in demand for lithium-ion batteries, in which HPMSM plays a vital role. As the EV market expands, so will the demand for these batteries. The choice of battery technology platform by EV manufacturers can influence demand for manganese sulfate, with the manganese contribution varying between 8% and 60%
- Europe, North America, Japan, Korea and many other countries import 100% of their manganese requirements, including high purity electrolytic manganese metal and HPMSM, which are essential materials used in the production of lithium-ion EV batteries

For more information

MINEDEX is a spatial and textual database of mining and exploration activity

MINEDEX

www.dmpe.wa.gov.au/minedex

GeoVIEW.WA is a free GIS-based spatial viewer

GeoVIEW.WA

www.dmpe.wa.gov.au/geoview



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