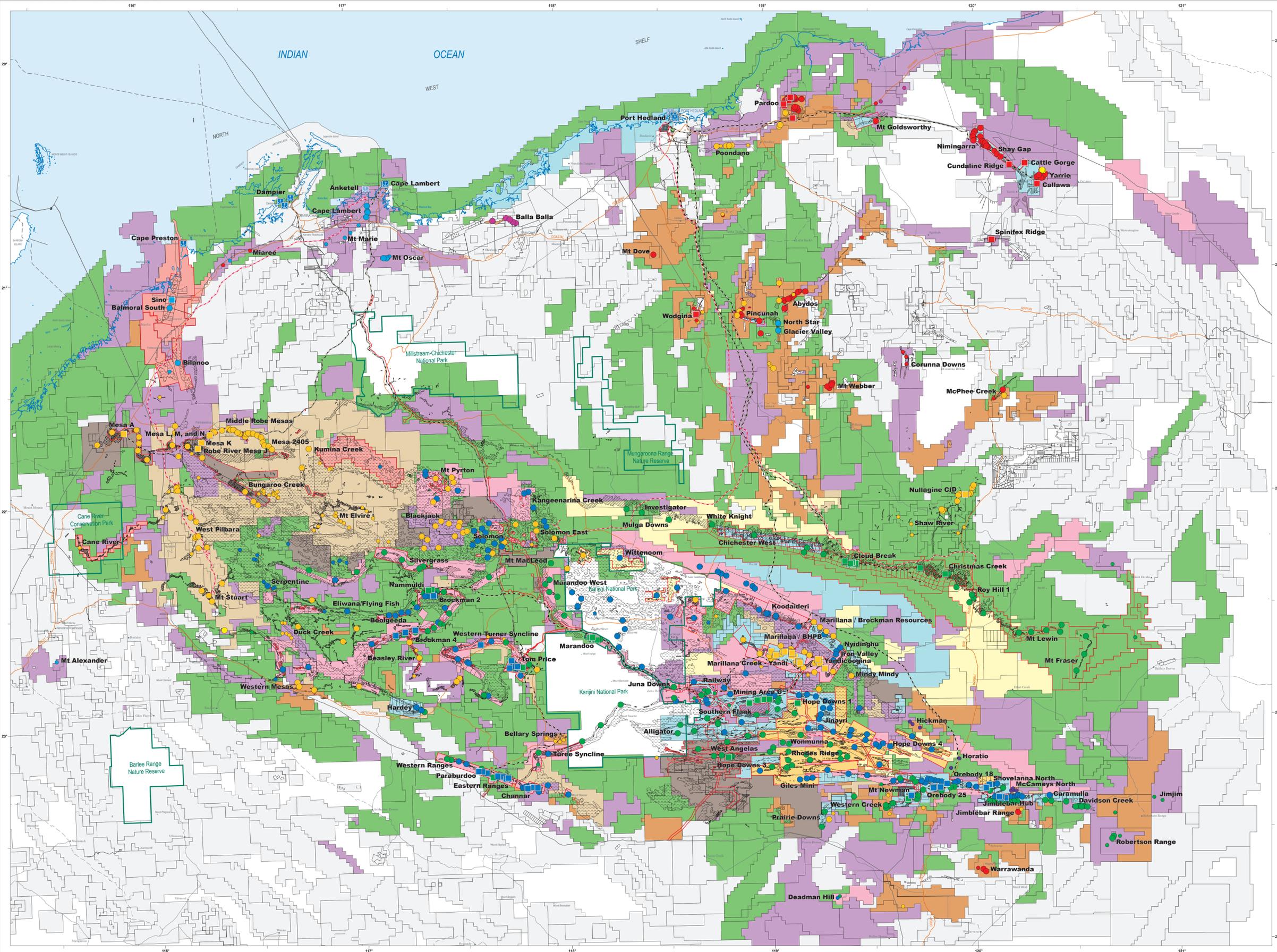


IRON ORE DEPOSITS OF THE PILBARA REGION — 2011



SITE TYPE AND STAGE OF DEVELOPMENT

(Symbol coloured by iron ore mineralization style)

- Operating mine
- Proposed mine, closed mine, or mineral deposit — with a mineral resource estimate
- Exploration site or prospect — without a mineral resource estimate

MINERALIZATION STYLES

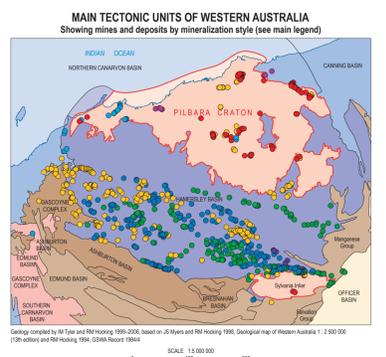
- Pacific and Ironstone-bearing paleoproterozoic mineralization or channel iron deposits (CID) of the Carcooba-Boke Pisolite and Poondano Formation. Mineralization style is 'Regolith-alluvial to beach placer mineralization'
- Hematisitic conglomerate of the Neoproterozoic El Creek Formation (Tarcunyah Group, Officer Basin), which formed in a near-shore environment (mined at Yampi 10) and hematitic conglomerate of the Paleoproterozoic Mt McGrath Formation (Wyloo Group, Ashburton Basin). Mineralization style is 'Stratiform sedimentary — oxide-hosted'
- Supergene-enriched hematite and hematite-goethite mineralization hosted by banded iron-formation of the Boodgeda Iron Formation or the Wongara Rhyolite (Hamersley Basin). Includes nearby scoria and diatrit deposits derived from the Boodgeda Iron Formation or the Wongara Rhyolite. Mineralization style is 'Sedimentary — banded iron-formation (supergene-enriched)'
- Supergene-enriched hematite and hematite-goethite mineralization hosted by banded iron-formation of the Brockman Iron Formation (Hamersley Basin). Includes nearby scoria and diatrit deposits derived from the Brockman Iron Formation. Mineralization style is 'Sedimentary — banded iron-formation (supergene-enriched)'
- Supergene-enriched hematite and hematite-goethite mineralization hosted by banded iron-formation of the Marra Mamba Iron Formation (Hamersley Basin). Includes nearby scoria and diatrit deposits derived from the Marra Mamba Iron Formation. Mineralization style is 'Sedimentary — banded iron-formation (supergene-enriched)'
- Supergene-enriched hematite and hematite-goethite mineralization hosted by banded iron-formation of the Cleaveland Formation and the Precambrian Member of the Archaean Pilbara Craton. Includes nearby scoria and diatrit deposits. Mineralization style is 'Sedimentary — banded iron-formation (supergene-enriched)'
- Magnetite-rich banded iron-formation or taconite. May be hosted by iron formations of the Archaean granite-greenstone terranes, the Neoproterozoic-Paleoproterozoic Hamersley Basin, or the Archaean Hamersley Complex. Mineralization style is 'Sedimentary — banded iron-formation (taconite)'
- Orthomagnetic layered mafic intrusives targeted for both iron (magnetite) and V-Ti (ilmenite)

IRON ORE TENEMENTS AND MINISTERIAL RESERVES BY COMPANY GROUP

- BHP Billiton plus joint ventures (JV) with CI Minerals (Ibico), Mitsui, POSCO, JFE Steel, and other Wheelabrator JV companies
- Rio Tinto plus JV's with CMEC (SinoSteel) and BocoSteel
- Rio Tinto plus JV's with Hancock Prospecting and Wight Prospecting
- Hancock Prospecting
- Robe River Iron Associates (Rio Tinto, Mitsui, Nippon Steel, Sumitomo)
- Minerology group of companies
- Fortescue Metals Group plus JV with Consolidated Minerals, BC Iron Ltd, Cullen Resources Ltd, and Talcott Mining Ltd. Includes iron ore tenements of Fortescue Metals Group, FMG Pilbara, and FMG Chichester
- Atlas Iron Ltd plus JV's with companies such as Talcott Minerals Pty Ltd, De Grey Mining Ltd, Choice Gold Mines Ltd, etc. Includes iron ore tenements of Gralla Resources NL and Aurco Resources Ltd
- API Management Pty Ltd (50% Aquila Resources Ltd and 50% AMCI Holdings Australia Pty Ltd) with JV partners such as De Beers Australia Exploration Ltd, Red Hill Iron Ltd, Cullen Resources Pty Ltd, Gralla Resources NL, and Hela Resources Ltd
- Other — iron ore and Ministerial Iron Ore Temporary Reserves. Some of these tenements may be joint ventured with the company groups above
- Other — not known as being explored for iron ore

IRON ORE GEOLOGY

- Zones of supergene enrichment
- Channel iron deposits and pisolite (Robe Pisolite and Poondano Formation)
- Brockman Iron Formation (note: also includes some Well Well Formation)
- Marra Mamba Iron Formation
- Banded iron-formation in granite-greenstone terrane



- Phanerozoic sedimentary and volcanic rocks
- Neoproterozoic sedimentary and volcanic rocks
- Meoproterozoic sedimentary and volcanic rocks
- Paleoproterozoic sedimentary and volcanic rocks
- Paleoproterozoic igneous and metamorphic rocks
- Neoproterozoic-Paleoproterozoic sedimentary and volcanic rocks
- Archaean granite-greenstone



Government of Western Australia
Department of Mines and Petroleum

Geological Survey of Western Australia

SCALE 1:750 000

ALBERS EQUAL AREA PROJECTION WITH CENTRAL MERIDIAN 121° AND STANDARD PARALLELS 17°30' AND 31°30'

HORIZONTAL DATUM: GEOCENTRIC DATUM OF AUSTRALIA 1994 (GDA94)

Legend

- Major road
- Formed road
- Track
- Railway, operating
- Railway, proposed
- Gas pipeline, operating
- Gas pipeline, proposed
- Oil pipeline, operating
- Iron ore port, operating or under development
- Iron ore port, proposed

Townsite

- population 10 000 – 15 000
- 1000 – 10 000
- less than 1000

Homestead

- Mulgooloona
- Arak

Locality

- Arak

Conservation estate boundary

- State Agreement Act Boundary
- External
- Internal (Fortescue Metals Group plus JV only)

DATA DIRECTORY

| Theme | Date Currency | Organization |
|----------------------|---------------------|---|
| Technic units | 2001 | Geological Survey of Western Australia, Department of Mines and Petroleum |
| Iron ore geology | 1996 | Geological Survey of Western Australia, Department of Mines and Petroleum |
| Supergene enrichment | 1991 | Geological Survey of Western Australia, Department of Mines and Petroleum |
| Mines and deposits | MAR 2011 | Geological Survey of Western Australia, Department of Mines and Petroleum |
| Mining tenements | FEB 2011 | Mineral Titles Division, Department of Mines and Petroleum |
| Cartography | FEB 2011 | Landgate, Department of Mines and Petroleum |
| Topography | 2010 | Landgate |
| Coastline | 1996 | Geoscience Australia |
| Rail | OCT 2004 - JUN 2005 | BHP Billiton, Hamersley Iron, Hancock Prospecting, FMG, API |

Compiled by Cooper, RW and Flett, DJ 2011

Cartography by PJ Beath/GeoSource

Colour coding for operating and proposed mines

Information on mines, deposits, prospects, and processing plants was extracted from the mine and mineral deposits (MINDIS) database. Data in MINDIS is updated on a regular basis. Information on site tenements, company groupings, and groupings are available on an accompanying CD.

Published by the Geological Survey of Western Australia

This map is published in digital format (PDF) and is available online at <http://www.dmp.wa.gov.au/CD/2011publications/>

Full copies of this map are available from the Information Centre, Department of Mines and Petroleum, 100 Park Street, East Perth, WA 6004.

Phone (08) 9222 2600 Fax (08) 9222 2444

Website: <http://www.dmp.wa.gov.au/> Email: geological_survey@dmp.wa.gov.au

The recommended reference for this map is: Cooper, RW and Flett, DJ 2011, Iron ore deposits of the Pilbara region — 2011 (1:750 000 scale). Geological Survey of Western Australia.

Tenements are colour coded if they are known to be targeted for iron ore from a combination of iron ore data Agreement Acts, authorisation to explore for iron ore granted or applied for under Section 111 of the Mining Act 1978, and company public announcements. This includes tenements at the application stage. Inclusion of such tenements here does not imply that the tenement applications will be granted or that iron ore authorisation under Section 111 will be granted. Other tenements shown in grey may also be prospective for iron ore. Colour coded iron ore tenements may also be prospective for other minerals.

Manufacturers Licenses (ML) have been applied for but given their specific company colour coding, the colour coding of the underlying tenements are shown in grey.

The tenement layer consists of many parameters (both graphical and geospatial applications) that do not display in this map. Call the Information Centre for more information.

However, the tenements are depicted as they form a 2D layer. Call should be taken when interpreting the colour coded tenements and, where necessary, further details should be obtained from the accompanying digital products or from DMP's online tenement database (TSDMP).

Iron ore deposits of the Pilbara region — 2011
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