

## **Overview of mineral exploration in** Western Australia for 2005–06

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**Overview** Notable highlights and trends for the industry during 2005–06, including some that are not encouraging for Western Australia, were as follows:

- Major greenfields gold exploration discovery at Tropicana, 220 km southeast of Laverton;
- A new gold mine was opened in the Pilbara region at Indee, and another gold mining operation is planned near Nullagine in early 2007;
- Spectacular gold intersections at Bright Star (30 km southeast of Laverton), Blue Spec near Nullagine, and at Wiluna;
- Renewed interest in the Spinifex Ridge molybdenum–copper project, with a bankable feasibility study progressing;
- Southdown, Karara, and Mount Gibson iron ore projects lead the way in the race to be the State's first iron-ore mine with a magnetite product;
- The Heron Resources Ltd and Inco Ltd joint venture has successfully completed Step 1 of the Kalgoorlie laterite nickel project and will continue to Step 2, and plans to produce about 50 000 tpa of contained nickel from the project by 2011;
- Australian mineral exploration expenditure in 2005–06 increased by 20.6%, but Western Australia experienced a 2.6% decrease over the same period;
- The worldwide non-ferrous mineral exploration expenditure increased by an estimated 35% (for calendar year 2005, Metals Exploration Group, Canada);
- During the last decade, Western Australia's share of global non-ferrous mineral exploration expenditure has fallen from 10 to 4% of the total. Australia (as a whole) is also losing market share, with its proportion falling from 17 to 13% over the same period;
- Western Australia's share of the national exploration expenditure for minerals (excluding petroleum) fell sharply from 59% in 2004–05 to 48% in 2005–06, the lowest level for at least 20 years;
- Western Australia continues to experience an unprecedented mineralproduction boom, with value of production up by 33% in 2005–06;
- We surmise that the mining and exploration industries are so focused on ensuring that the numerous, large development projects are successful

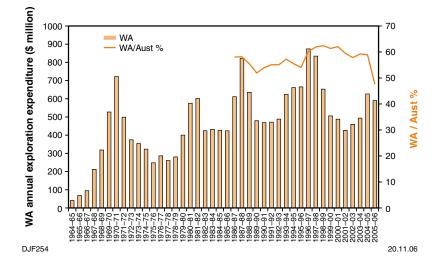


Figure 1. Mineral exploration expenditure in Western Australia, by financial year (2005–06 dollars)

that exploration activity is not being supported by mining companies as strongly as expected for the long-term benefit of the industry and Australia's economy.

Australian mineral exploration expenditure\* rose by 20.6% (\$212 million) from \$1028.3 million in 2004–05 to \$1240.4 million in 2005–06 (2005–06 dollar terms). During 2005–06, mineral exploration expenditure in Western Australia fell by 5.6% from \$625.4 million to \$590.2 million, well below the peak of \$874 million in 1996–97 (in 2005–06 dollar terms; Fig. 1).

Despite the commodity boom, Western Australia's share of the national spend on mineral exploration fell sharply during 2005–06, from 59% (2004–05) to 48%, its worst level for at least twenty years (Fig. 1). Quarterly mineral exploration data also highlights this diverging trend in mineral exploration between Western Australia and the rest of Australia (Fig. 2). Despite this, Western Australia still accounts for the major proportion of exploration dollars expended in Australia for major commodities such as iron ore (97%), nickel–cobalt (79%), diamond (49%), gold (60%), heavy mineral sands (44%), silver–lead–zinc (20%), and copper (7%).

Recent mineral exploration expenditure in Australia and Western Australia has not kept pace with the boom in worldwide exploration expenditure, and Australia and Western Australia have again both lost market share in the expanded pool of exploration capital (Fig. 3; based on data compiled by the Metals Economics Group of Halifax, Canada, www.metalseconomics.com). During the last decade, the proportion of the world's non-ferrous mineral exploration expenditure in Australia has dropped from 17 to 13% of the total, whereas that for Western Australia has dropped from 10 to 4% of the total. In stark contrast, the proportion of worldwide mineral exploration expenditure spent in Canada recovered strongly after 1997, whereas the proportion has continued to fall in Australia and Western Australia (Fig. 3). The buoyant situation in Canada reflects a combination of high-profile discoveries, ongoing exploration success, and favourable and innovative government regimes (including fiscal incentives to exploration).

<sup>&</sup>lt;sup>c</sup> All \$ figures in Australian dollars unless otherwise specified. All exploration expenditure figures and drilling statistics are compiled by the Australian Bureau of Statistics (ABS) unless otherwise specified.

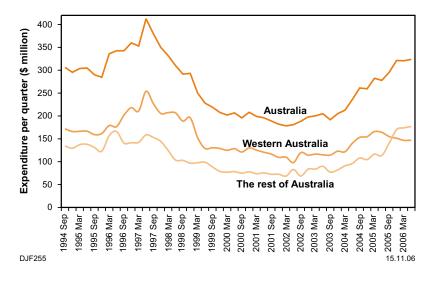


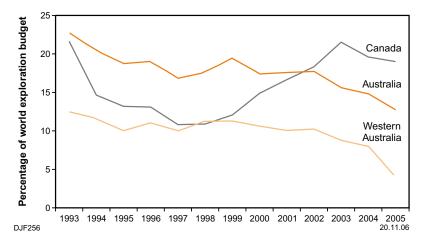
Figure 2. Mineral exploration expenditure, by quarter and on seasonally adjusted terms, for Western Australia versus the rest of Australia (2005–06 dollars)

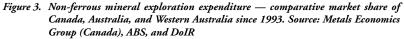
## Developments and mineral exploration highlights by commodity

Only iron ore and copper–lead– zinc–silver attracted increased exploration expenditure in Western Australia during 2005–06, with decreased exploration expenditure for gold, nickel–cobalt, and diamond. Iron ore expenditure has set a new record of \$149.7 million in 2005–06. Expenditure on nickel exploration has declined in 2005–06 from an apparent peak in 2004–05.

Gold Trends in the gold industry in Western Australia during 2005–06 included:

- A 3.6% fall in gold production to an output of 161 t;
- A 10% decline in gold exploration expenditure, continuing an eightyear-old trend;
- The international gold price rose to 20-year highs, reaching US\$610 in April 2006;





- Investor interest in Western Australia for gold remained very subdued;
- The world-class Telfer Au–Cu mine ramped up to near-full production capacity, while the go-ahead for developing the Boddington Au–Cu mine was announced;
- The major greenfields gold exploration discovery at Tropicana\*.

Although gold exploration has been the backbone of the mineral exploration industry in Western Australia for many years, during the last ten years it has undoubtedly lost its shine — gold exploration expenditure was around 75% of the total mineral exploration expenditure in the mid-1990s, but has declined to only 40% during 2005–06 (Fig. 4). During 2005–06,

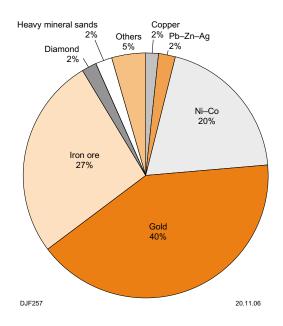


Figure 4. Mineral exploration expenditure in Western Australia, by commodity (2005–06 dollars)

\$240.3 million was expended on gold exploration in Western Australia, which is a decrease of 10% (\$27.6 million) from the \$267.9 million spent in 2004–05 (Fig. 5). The exploration expenditure is now 35% below its peak levels experienced eight years ago during 1996–97, and is at a level last experienced more than twenty years ago. A considerable amount of exploration focused on converting near-mine mineral resources into ore reserves, thus diverting the focus from programs for discovering new deposits in greenfields areas. An inadequate level of greenfields mineral exploration is of ongoing concern for the future of gold mining in this State. The decline of gold exploration expenditure in Western Australia is also reflected in gold production, both of which have continuously declined over the last 8 years (Fig. 6).

Despite this, important gold discoveries are still being made in Western Australia, but few have been sufficiently spectacular to excite international

<sup>\*</sup> For further information on the numerous mines, deposits, or prospects mentioned in this article see the websites for the companies mentioned, which contain copies of company announcements to the Australian Stock Exchange (ASX). For location information either sees the relevant company websites, or DoIR's online databases (MINEDEX or GeoVIEWER.WA) at www.doir.wa.gov.au, or Cooper and Flint (2005).

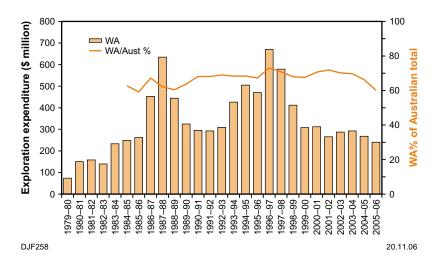


Figure 5. Gold exploration expenditure in Western Australia, by financial year (2005–06 dollars)

attention. The most newsworthy was the greenfields discovery by the Independence Group NL and AngloGold Ltd joint venture at Tropicana (220 km east of Laverton and apparently in rocks of the Albany–Fraser Orogen), which has potential to host gold deposits containing more than 1 Moz of gold. This is the best gold discovery in Western Australia since the discovery of Thunderbox about seven years ago. The gold intersections at Tropicana include 42 m at 3.3 g/t Au and 32 m at 6.6 g/t Au. Within 15 km of Tropicana, other new prospects have been discovered at Rusty Nail, Kamikaze, Black Feather, and Havana.

Elsewhere in Western Australia spectacular gold intercepts were obtained at Brightstar (22 m at 28.6 g/t Au) southeast of Laverton by A1 Minerals Ltd, at Blue Spec near Nullagine (3 m at 37 g/t Au) by Northwest Resources Ltd, and at Wiluna (18 m at 10.42 g/t Au) by Agincourt Resources Ltd.

At Trident (south of Kambalda), Avoca Resources Ltd has an estimated resource of 4.3 Mt at 6.2 g/t gold for 855 000 ounces of contained gold,

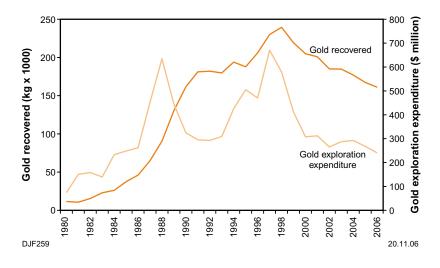


Figure 6. Gold exploration expenditure and production in Western Australia (years ending 30 June; 2005–06 dollars)

with plans in place to commence gold production. At Golden Eagle prospect near Nullagine, further high-grade gold intersections were reported by Wedgetail Exploration NL from the Falcon and Condor prospects. Wedgetail plans to start a mining operation in early 2007 with an output of 70 000 ounces of gold per year. At Burbanks near Coolgardie, Barra Resources Ltd reported more exploration success (Wahloo Shoot: 6.8 m at 33.2 g/t Au, 11.9 m at 4.9 g/t Au, and 9.5 m at 3 g/t Au).

Development highlights for gold in Western Australia have been dominated by the decision by Newmont Mining Corporation and AngloGold Ashanti Ltd to reopen the Boddington gold–copper mine, 110 km southeast of Perth, in the Yilgarn Craton. Initial gold–copper production from Boddington is expected in late 2008. Total resources of contained gold at Boddington are estimated at 19.7 Moz and that of contained copper at 790 kt. The average annual production will be in excess of 800 000 oz of gold and 30 000 t of copper.

Gold mines opened in the State during 2005–06 include the following: Tanami–Coyote (572 000 oz of contained gold) 280 km southeast of Halls Creek by Tanami Gold NL; Indee (529 000 oz of contained gold) south of Port Hedland by Range River Gold Ltd; Comet Vale – Sand Queen (136 000 oz of contained gold) south of Menzies by Reed Resources Ltd and Kingsrose Pty Ltd; and Burbanks (74 000 oz of contained gold) near Coolgardie by Barra Resources Ltd.

- Iron Highlights in Western Australia during 2005–06 included:
  - Unprecedented price increases meant that although Western Australian iron ore production increased by only 5% in quantity, it jumped by a remarkable 63% in value;
  - Western Australian iron-ore exploration expenditure was at the highest level ever recorded (A\$156 million), representing 27% of the State's total (Figs 4 and 7);
  - Numerous mines targeting zones of supergene enrichment were being developed or at an advanced feasibility stage, and the State moved significantly closer to its first iron ore mine with a magnetite product;
  - Overseas companies greatly increased their direct ownership or involvement (e.g. through long-term off-take agreements) in the Western Australian iron ore industry.

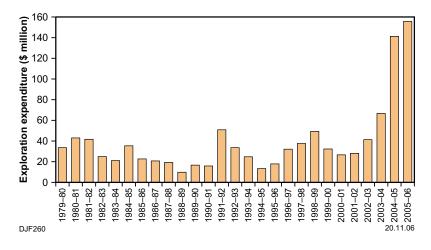


Figure 7. Iron ore exploration expenditure in Western Australia, by financial year (2005–06 dollars)

The unprecedented iron ore boom during the past two years was driven by extremely strong customer demand for iron ore, particularly from China, concomitant with a worldwide supply shortage. The production of iron ore in 2005–06 was 244 Mt (valued at A\$13 billion), which is an increase of 5% (11 Mt) compared with 2004–05 production of 233 Mt (valued at A\$8 billion), whereas the value of production increased by 63%. The major producers in the Pilbara region are responding rapidly by expanding their operations at existing projects and planning new projects. The high iron-ore prices have greatly assisted the capital raisings of junior companies, opened up the industry to juniors, and diminished the duopoly of Rio Tinto and BHP Billiton. New iron ore mines that were under development during 2005–06 were Koolanooka, Jack Hills, Koolan Island, and Christmas Creek - Cloud Break. Numerous iron ore projects were at the feasibility stage, with Southdown (Grange Resources Ltd), Karara (Gindalbie Metals Ltd), and Mount Gibson (Asia Iron Holdings Ltd and Shougang Group) leading the way in the race (at the moment) to be the State's first iron-ore mine with a magnetite product.

At present over 80 companies are exploring for iron ore in Western Australia, with significant and diverse direct-equity investment by Chinese, Korean, and Japanese companies, which seek to ensure supplies at lower than current prices.

Iron ore exploration targeted several mineralization styles including: channel iron deposits; supergene-enriched hematite over Archean (Marra Mamba) to Paleoproterozoic (Brockman) banded iron-formations (BIF); primary magnetite in BIF of the Pilbara and Yilgarn Cratons; magnetite in BIF within Mesoproterozoic gneiss terrane of the Albany–Fraser Orogen; clastic hematite in Paleoproterozoic–Mesoproterozoic sedimentary rocks of the Kimberley Basin (Cockatoo Island, Koolan Island) and the Carr Boyd Basin (Pompeys Pillar); and hematite in granular iron within the Frere Formation in the Paleoproterozoic Earaheedy Basin (Giralia Resources NL). There was ongoing interest by numerous companies in primary magnetite mineralization within BIF horizons throughout the Yilgarn Craton — to as far north as Wiluna (Golden West Resources Ltd) and as far south as Ravensthorpe (Resource Mining Corporation Ltd, Traka Resources Ltd).

Nickel Highlights in Western Australia during 2005–06 included:

- The international price rose to 18-year highs, reaching US\$20 754 per tonne in April 2006;
- Nickel production in Western Australia increased by 6% to 191 kt of contained nickel;
- Nickel exploration expenditure in Western Australia fell by 25%; primarily due to completion of the feasibility study of the Ravensthorpe laterite project, with the project now under development. The planned production rate is about 50 000 t of contained nickel.

The 6% rise in nickel production in Western Australia during 2005–06 is set to escalate, with two advanced lateritic nickel projects coming on-line. BHP Billiton is developing the Ravensthorpe project with plans to produce about 50 000 tpa of contained nickel, commencing production in late 2007. In a longer term, Heron Resources Ltd and Inco Ltd plan to produce about 50 000 tpa of contained nickel from the Kalgoorlie nickel laterite project, with the bankable feasibility study for the project expected to be completed by 2011.

Exploration expenditure for nickel (and cobalt) reached a peak of \$153.9 million in 2004–05, but fell by 25% in 2005–06 to \$114.9 million (Fig. 8); this accounted for 20% of the total Western Australian exploration

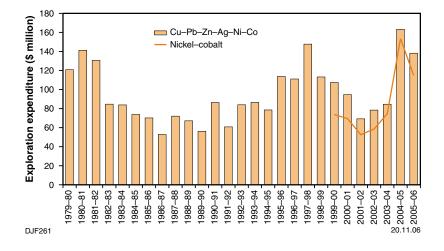


Figure 8. Nickel, cobalt, and base metal exploration expenditure in Western Australia, by financial year (2005–06 dollars)

expenditure in 2005–06 (Fig. 4). Most of the exploration activity centred on the Leinster, Forrestania, Kambalda, and Gerry Well regions of the Yilgarn Craton, and the Halls Creek region in the Lamboo Complex.

Significant brownfields exploration successes in the nickel sector included:

- High-grade nickel sulfide mineralization at Prospero, Tapinos, Anomaly 1, and Alec Mairs (all near Cosmos) and Sinclair (about 90 km south of Cosmos) by Jubilee Mines NL;
- T5, T5 South, \$2, and T Zero North at Flying Fox Forrestania by Western Areas NL;
- North Miitel and South Miitel (40 km south of Kambalda) by Mincor Resources NL;
- Copernicus North (70 km northeast of Halls Creek) by Sally Malay Ltd and Thundelarra Exploration Ltd.

There was also significant exploration success in the Yilgarn Craton at Pioneer JH (85 km south of Kambalda; Pioneer Nickel Ltd), the Marshall prospect of the Golden Ridge project (40 km north of Kambalda; Australian Mines Ltd and Pioneer Nickel Ltd), the Talc Lake prospect of the Roe Hills project (about 95 km east of Kambalda; Oroya Mining Ltd), Cassini (55 km south of Kambalda; Jupiter Mines Ltd), Emu Lake nickel project (70 km northeast of Kalgoorlie; Image Resources NL), Martins Zone of the Riverina project (45 km west of Menzies; Barra Resources Ltd), Jocks Dream prospect (55 km north-northeast of Southern Cross; Western Areas NL), Bodkin and Longbow prospects (both within 10 km of Wiluna; Agincourt Resources Ltd). Exploration successes in the Pilbara Craton included Ruth Well (15 km south of Karratha; Fox Resources Ltd) and Daltons (70 km southwest of Marble Bar; Giralia Resources NL).

Base metals Highlights in Western Australia during 2005–06 included: (copper-lead-zinc-silver)

- A 15% increase in copper production, attributed mostly to the Telfer gold–copper mine;
- Production of lead up from 2324 to 58 739 t following the opening of the Magellan lead mine;

• A 123% rise in zinc production, mostly due to improved performance at Golden Grove.

There was a significant increase in production of copper, lead, and zinc in the State in 2005–06, with copper increasing by 15% (from 61 933 t in 2004–05 to 71 060 t in 2005–06), largely due to the revamping of the Telfer gold–copper operation. The opening of the Magellan lead mine in 2005 resulted in a considerable increase in lead production in the State from 2324 t (which was a byproduct at the Golden Grove operation) in 2004–05 to 58 739 t in 2005–06. The production of zinc increased by 123% (from 48 400 t in 2004–05 to 107 863 t in 2005–06) due to improved production from the Golden Grove operation.

Exploration expenditure directed at copper–lead–zinc–silver in Western Australia considerably improved from \$9.5 million in 2004–05 (dollars of the day) to a total of \$23.4 million in 2005–06, attributed mainly to exploration and development of the Jaguar deposit (Archean volcanogenic massive sulfide (VMS)-style) in the Yilgarn Craton; exploration for Archean VMS-style mineralization in the Pilbara Craton at Whundo, Panorama, Sulphur Springs, and Orchard Well; exploration for VMSstyle mineralization in the Halls Creek Orogen at the Eastman prospect; exploration for stratabound sediment-hosted mineralization in the Edmund Basin at Abra; and exploration for the Mississippi Valley-type Pb–Zn mineralization (sedimentary carbonate-hosted deposits) in the Lennard Shelf, where Teck Cominco Ltd announced plans to restart the mining operations in March 2007, at a cost of A\$20 million.

**Diamond** Highlights in Western Australia during 2005–06 included:

- Diamond sales up 29% to 29.3 Mcts, from production at Argyle and Ellendale;
- Diamond exploration expenditure down a further 32%, the fourth year of decline;
- Greenfields exploration success in the west Pilbara (Blacktop, Clurrie, and Railway prospects).

Diamond production (strictly sales production rather than mine production) in Western Australia in 2005–06 was 29.3 Mcts, which is an increase of 29% (6.5 Mcts) compared with 2004–05 production of 22.8 Mcts. Rio Tinto announced plans to develop a US\$760 million underground mine at Argyle in the east Kimberley, and an additional US\$150 million allocated to openpit cutback and production until underground mining commences in 2008.

At Ellendale, in the west Kimberley, mining expanded at Ellendale 9 and there was commencement of mining at Ellendale 4. The Ellendale 9 plant was upgraded to 3.3 Mtpa in mid-2006, and this will be followed by another upgrade to 4.4 Mtpa in mid-2007. Gravels extracted at Terrace 5 yielded 2114 diamonds weighing 826 cts; the diamonds have an average size of 0.39 cts, with the largest stone weighing 5.92 cts. Numerous other sites in the Ellendale area were being drill tested and bulk sampled (Kimberley Diamond Company NL, Blina Diamonds NL).

Greenfields exploration success was focused at three prospects in the west Pilbara, 90 km south-southwest of Karratha — Blacktop, Clurrie, and Railway (De Beers Australia Exploration Ltd, Helix Resources Ltd).

Expenditure decreased on diamond exploration by a further 32% during 2005–06, falling by \$5.3 million to \$11.1 million for the year (2005–06 dollar terms; Fig. 9), which is only 2% of the total Western Australian

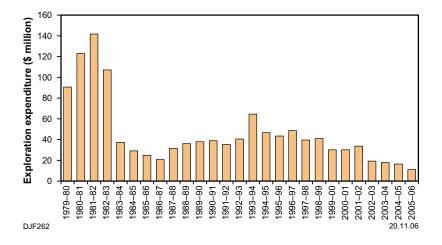


Figure 9. Diamond exploration expenditure in Western Australia, by financial year (2005–06 dollars)

mineral exploration expenditure (Fig. 4). This is the fourth year in a row that diamond expenditure in Western Australia has declined, reflecting the general lack of exploration success and hence investor interest. The decline was primarily due to reduced resource–reserve drilling activities at Argyle, with the openpit approaching the end of its estimated mine life and the underground feasibility study being completed. Although there were encouraging mining and exploration results in the Ellendale region, they were not sufficient to outweigh the decreased exploration expenditure at Argyle.

Heavy minerals (Ti–Zr–garnet) The production of heavy mineral sands (ilmenite, leucoxene, zircon, and garnet) in Western Australia in 2005–06 was 1.3 Mt valued at A\$799.5 million, which is slightly less than the 2004–05 production of 1.4 Mt valued at A\$800.9 million. Sector highlights were the commencement of mining at Gingin and Wagerup near Perth in mid-2005 (Iluka Resources Ltd); proposals to mine at Waroona and Cataby (both deposits near Perth; Iluka Resources Ltd) and also at Coburn (near Shark Bay; Gunson Resources Ltd); and completion of a bankable feasibility study of the Keysbrook deposit (south of Perth; Olympia Resources Ltd).

In greenfields exploration during 2005–06, there was renewed interest in strandlines of the Eucla Basin in Western Australia. This followed on from the discovery in late 2004 of world-class zircon-rich heavy mineral sands in the Eucla Basin of South Australia at the Jacinth and Ambrosia prospects (Iluka Resources, Adelaide Resources Ltd). Elsewhere, the main greenfields exploration projects are at Coburn (250 km north of Geraldton), which progressed during 2005–06 to the development phase, and Keysbrook (55 km south of Perth), which is progressing steadily through the environmental approval process.

Exploration expenditure in this sector during 2005–06 in Western Australia fell by 16% (\$2.5 million) to \$12.8 million. However, expenditure is still better than the \$8–11 million per year that has been the trend during the last ten years (Fig. 10). With the switch in exploration focus to the Murray Basin in Australia's eastern states in the mid-1990s, Western Australia's share of Australian exploration expenditure for heavy minerals had fallen from nearly 70% of the total in the mid-1990s to only 29% in 2002–03. However, during 2005–06 Western Australia's share recovered to 44% of the total.

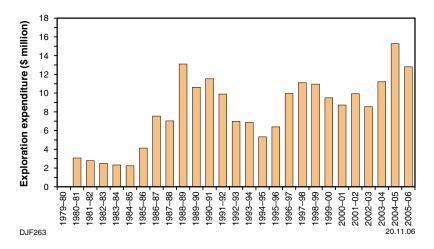


Figure 10. Heavy mineral sands (Ti–Zr) exploration expenditure in Western Australia, by financial year (2005–06 dollars)

Other commodities The exploration expenditure for other mineral commodities in Western Australia in 2005–06 was 5% of the total (Fig. 4) and decreased by 7% (\$1.9 million) to \$26.8 million in 2005–06 (in 2005–06 terms). 'Other commodities' include all industrial minerals, construction materials, platinum group elements, molybdenum, tantalum, manganese, chromium, vanadium, rare earth elements, and coal-lignite. A new measured, indicated, and inferred resource totalling 500 Mt at 0.06% Mo, 0.09% Cu, and 1.7 g/t Ag has been estimated for the Spinifex Ridge molybdenum-copper deposit in the Pilbara region and a bankable feasibility study is in progress. Exploration expenditure for all these commodities is still at a relatively high level compared with about 5 years ago, which can be attributed to the keen interest in steel alloying metals (manganese, chromium, and vanadium) and an awakening of interest in coal. Although there has been renewed interest in uranium during 2005-06 and much stock-market activity, there has been negligible exploration expenditure in Western Australia.

**Drilling activity** Exploration drilling activity throughout Australia has been rising modestly over the last four years (as has general exploration expenditure), but with this only partially offsetting the huge decline from peaks in 1996–97 to 2001–02 (Fig. 11). However, the rise in metres drilled during 2005–06 in Australia was only 1% (0.053 million metres) to a total of 6.837 million metres. The estimated mineral exploration drilling in Western Australia follows the same trend (based on Western Australia's proportion of total Australian exploration expenditure for each year).

However, mineral exploration drilling in Australia and in Western Australia is now only at a level of around half that during the last boom of 1996–97. This highlights several factors, including the extreme severity of the five-year downturn (1996–97 to 2001–02) and the lack of significant RAB drilling in greenfields areas, which characterized the previous exploration boom that peaked in 1996–97. The data support the suggestion that government financial incentives should be directed at stimulating more greenfields exploration, particularly drilling.

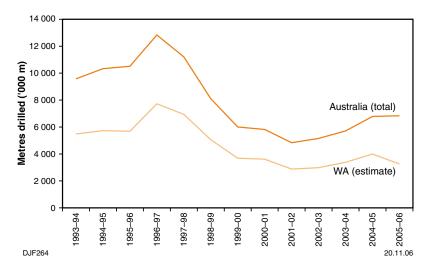


Figure 11. Mineral exploration drilling in Australia and Western Australia, by financial year (metres drilled)

Mining tenement activity

There was an increase in the number of granted tenements (in force) during 2005–06; this is in contrast to the decreasing trend in exploration expenditure. The number of granted tenements (all tenement types combined) increased by 8.6% (1411) from a total of 16 347 in force at 30 June 2005 to 17 758 at 30 June 2006. A similar trend is shown by the number of tenement applications (Fig. 12). The area under granted tenure increased by 38% from a total of 26.3 Mha at 30 June 2005 to 36.3 Mha at 30 June 2006.

Trends in longer term data since 1983–84 (Fig. 12) show some correspondence between exploration expenditure and tenement activity (granted tenements and tenement applications). The trend in increased tenement activity appears to have been a leading indicator of increased exploration expenditure. It would be encouraging if this trend is repeated in the next year or two following the recent increasing trends in the number of tenements granted and tenement applications.

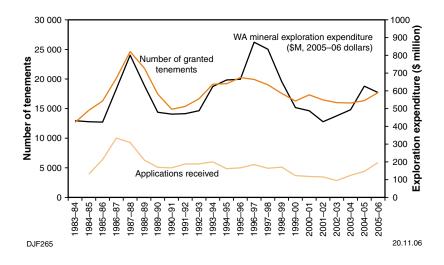


Figure 12. Trends in exploration expenditure and tenement activity (1904 and 1978 Mining Acts) since 1983–84. Source: DoIR

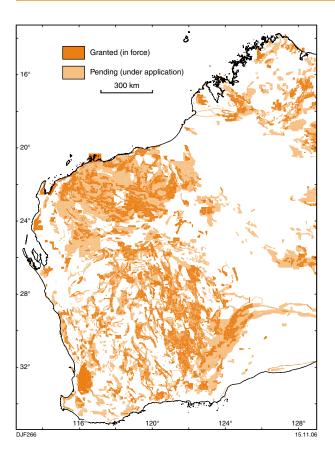


Figure 13. The distribution of mining and exploration tenements, granted and pending, in Western Australia as at 30 June 2006

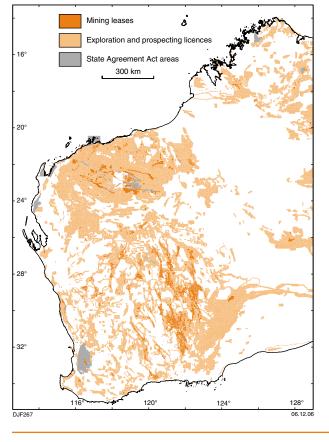


Figure 14. The distribution of mining leases, exploration and prospecting licences (granted and pending) and State Agreement Act areas in Western Australia as at 30 June 2006 The distribution of tenements, both granted and under application at 30 June 2006, is shown in Figure 13. The distribution of mining leases, exploration and prospecting licences (granted and under applications) and State Agreement Act areas is shown in Figure 14.

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