



Australian *Mineral* EXPLORATION

FEBRUARY 2009

A REVIEW OF EXPLORATION FOR THE YEAR **2008**

An extended version of this review is available at www.ga.gov.au

OVERVIEW

- » Australian mineral exploration spending in 2007-08¹ rose by 41% to a record \$2461.4 million² of which 44% was spent on the search for new deposits³.
- » Spending rose in all States and the Northern Territory; Western Australia dominated with 51% of Australian mineral exploration spending.
- » Base metals were the dominant target with 32% of exploration spending while gold was the major commodity sought with 24% of total spending.
- » Exploration results were announced for a wide range of commodities from across the country with significant increases in resources at the Prominent Hill copper-gold project in South Australia, Cadia gold-copper project in New South Wales, Cloncurry copper and gold project in Queensland and the Solomon iron ore project in Western Australia. High-grade nickel intersections were reported from the Spotted Quoll and Lounge Lizard deposits in Western Australia.



Pilbara region of Western Australia from the Radiometric Map of Australia

EXPLORATION REVIEW

Australian mineral exploration expenditure rose by 44% to \$2461.4 million in 2007-08¹ according to the Australian Bureau of Statistics (ABS). This was a record for exploration spending in Australia in both current and constant dollars (Figure 1).

Base metals were again the major exploration target in 2007-08, having overtaken gold in 2006-07, as spending rose 41% to \$783.4 million with nickel up 68% to \$303.3 million, zinc-lead-silver up 34% to \$186.6 million, and copper exploration expenditure rising 25% to \$293.5 million. This was a record in constant dollar terms, exceeding spending at the peak of the 'nickel boom' in 1970-71 and the peak in base metal (and other) exploration in 1980-81. Iron ore exploration spending rose 58% to reach a record \$449.8 million. Coal exploration was up 21% to \$234.8 million, the highest in constant dollar terms since 1981-82 and the third highest ever recorded. Uranium exploration spending doubled in 2006-07 and more than doubled again in 2007-08 to reach a record \$231.6 million, exceeding (in constant dollar terms) the last peak in uranium exploration in 1981-82.

¹Australian financial year from 1 July 2007 to 30 June 2008.

²All monetary references in this paper are to Australian dollars unless otherwise stated.

³Exploration spending on the search for new deposits covers exploration for previously unknown mineralisation or exploration on known mineralisation which is not yet classified as a resource.

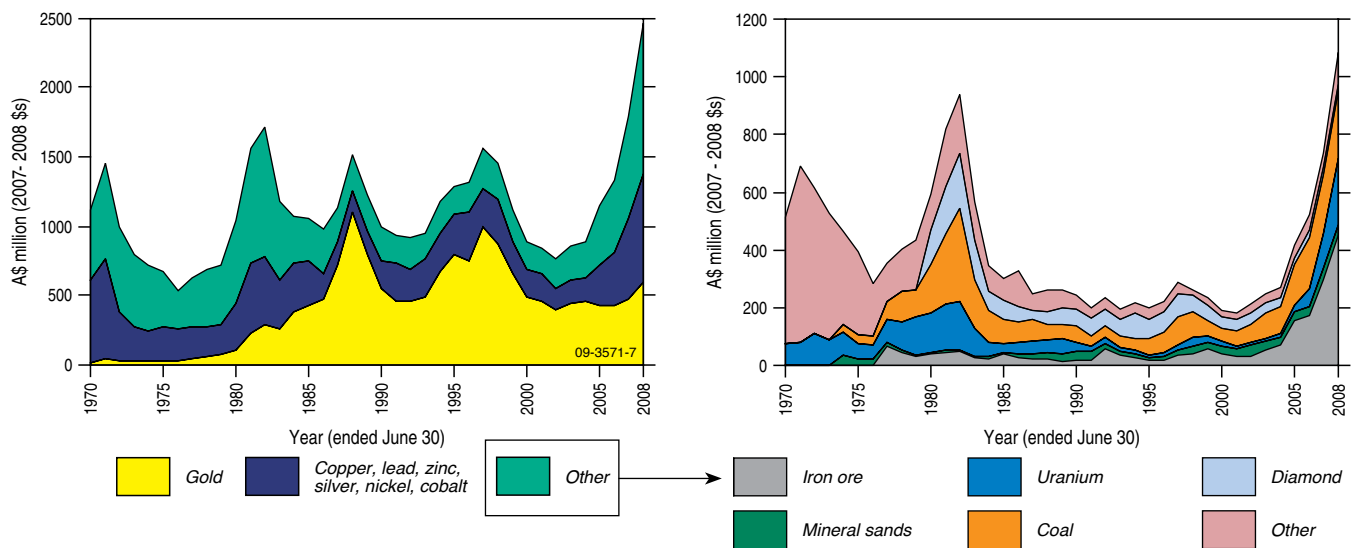


Figure 1: Australian mineral exploration expenditure in constant 2007-08 dollars. Based on ABS data deflated by Consumer Price Index.

Gold remained the largest commodity targeted in 2007-08 but, in contrast to the last two major peaks in exploration which were based on gold, gold's share of total exploration spending fell to 24% (\$592.7 million), its lowest share since the peak of the last mining boom in 1981-82 (Figure 1). This fall, despite recent high gold prices and increased gold exploration, is due to growth in spending on base metals, iron ore, coal and uranium.

Spending increased in all States and the Northern Territory. Western Australia remained dominant attracting \$1259.8 million, an increase of 51%. In Queensland, spending rose by 46% to \$397.8 million while in South Australia an increase of 36% saw spending rise to \$355.2 million. Other increases were: New South Wales up 32% to \$189.9 million; Victoria up 14% to \$93.7 million; Northern Territory up 44% to \$132.7 million and in Tasmania spending rose by 37% to \$32.4 million.

ABS survey data showed that, nationally, 41% of spending was on exploration for new deposits, a significant increase compared to 36% in 2006-07. This compares closely with the Metals Economics Group (MEG) world survey of non-ferrous minerals exploration budgets for 2008 which found that 40% of exploration budgets in Australia were for grassroots exploration.

In 2007-08, ABS reported that exploration drilling totalled 9.756 million metres, an increase of 1.301 million metres (15%) from 2006-07. Of this increase, exploration drilling in the search for new mineralisation rose to 3.92 million metres. Exploration of existing mineralisation rose by 0.621 million metres to 5.736 million metres. In line with the exploration spending data, 40% of exploration drilling was for the search for new mineralisation.

The MEG survey of world non-ferrous mineral exploration budgets for 2008 reported an increase of 26% to an estimated record total budget of US\$13.2 billion. Including uranium, MEG estimates that world budgets for non-ferrous mineral exploration totalled US\$14.4 billion. Of the total, including uranium, US\$2080.9 million or 14.5% was directed to exploration in Australia. Australia's share of global non-ferrous mineral exploration budgets (excluding uranium) rose to 13.6% as Australia retained its position as the country with the second highest share of budgets after Canada.

According to the MEG survey, 56% of the 2008 non-ferrous mineral exploration budgets for Australian-based companies was for exploration

in Australia. The survey included 519 companies with non-ferrous exploration budgets of more than US\$100 000 that were exploring in Australia. Budgets for Australian non-ferrous mineral exploration included: gold (US\$700.4 million), base metals (US\$824.5 million) and uranium (US\$268.3 million).

Some 49 Initial Public Offerings on the Australian Securities Exchange in 2008 were fully or partially for mineral exploration in Australia. This is a substantial reduction from the 122 listed in 2007. The major listing in 2008 was Ivanhoe Australia Ltd which raised \$125 million out of total minerals IPO raisings of \$486 million.

EXPLORATION

Record levels of exploration in Australia in 2008 resulted in a very large number of drill intersections of significance for most commodities. A selection of these results is reported below. In addition, earlier stage exploration activities including, rock chip sampling, geochemical and geophysical surveying identified many prospects for further, more detailed exploration. In Table 1, a selection of Australian mineral discoveries in recent years is shown.

Table 1: A selection of Australian mineral discoveries since 2000.

Year	State	Deposit/Project	Commodities	Status
2000	WA	West Musgraves	Ni, Cu, Co	Exploration; Preliminary resource: 392 Mt @ 0.3% Ni, 0.33% Cu
2000 and later	WA	Golden Grove orebodies	Cu, Pb, Zn, Ag	Mine; Resource: 1.4 Mt Zn, 0.8 Mt Cu, 0.13 Mt Pb, 44 Moz Ag, 1 Moz Au
2000 and later	WA	Flying Fox orebodies	Ni	Mine; Resource: 105 598 t Ni
2000	NSW	Hera	Au, Zn, Pb, Cu, Ag	Evaluation as source of ore for Endeavor Mine plant; Resource: 2.2 Mt @ 3.4g/t Au, 4.2% Zn, 3.1 Pb, 0.2% Cu, 18g/t Ag
2001	NSW	Wyoming	Au	Exploration with feasibility study due mid-2009; Resource: 0.6 Mozs Au
2001	SA	Prominent Hill	Cu, Au	Production due early 2009; Resource: 2.5 Mt Cu, 7.4 Moz Au, 22.6 Moz Ag
2002	WA	Jaguar	Cu, Pb, Zn, Ag,	Mine; Ore Reserve: 1.2 Mt @ 2.8% Cu, 6.1% Zn, 147g/t Ag
2002	WA	Copernicus	Ni, Cu, Co	Mine not currently operating; Resource: 10 600 t Ni, 6900 t Cu, 420 t Co
2004 and later	WA	Alec Mairs orebodies	Ni	Mine with production from AM1 orebody
2004	WA	Trident	Au	Mine; Resource: 1.45 Mozs Au
2004	SA	Jacinth & Ambrosia	Mineral sands	Mine construction; Production due mid-2010
2004	WA	Prospero	Ni	Development; Probable reserves 1.19 Mt @ 4.45% Ni
2005	WA	Tropicana	Au	Pre-feasibility studies; Resource: 5 Mozs Au
2005	SA	Four Mile	U	Decision to mine Four Mile West; Resource 3.9 Mt @ 0.37% U ₃ O ₈
2005	SA	Tripitaka	Mineral sands	Prefeasibility study; Resource: 28 Mt @ 2.3% HM
2005	SA	Carapateena	Cu, Au	Exploration; 905 m @ 2.1% Cu, 1.0g/t Au
2006	NSW	McPhillamys	Au	Exploration; 366 m @ 1.85g/t Au
2006	WA	Cooljarloo North	Mineral sands	Scoping study completed; Resource: 260 Mt @ 2.4% HM
2006	QLD	Rocklands	Cu	Prefeasibility study; Exploration continuing: 133 m @ 6.13% Cu
2007	WA	Spotted Quoll	Ni	Exploration; 12 m @ 9.6% Ni; Resource: 1.05 Mt @ 7.2% Ni
2007	SA	Dromedary	Mineral sands	Exploration; Eucla Basin
2007	WA	Cyclone & Hurricane	Mineral sands	Exploration; Resource for Cyclone 60 Mt @ 3.1% HM; Eucla Basin
2008	SA	Mojave	Mineral sands	Exploration; HM grades from 1-22.2% HM; Eucla Basin
2008	WA	Musket	Au	Grassroots discovery; Exploration; 18 m @ 10.9g/t Au
2008	VIC	Stavelly	Cu, Pb, Zn, Ag, Au	Exploration; Resource 47 300 t
2008	QLD	Merlin (Mt Dore)	Mo, Re	Exploration; 10 m @ 6.73% Mo, 150.7g/t Re

GOVERNMENT PROGRAMS

GEOSCIENCE AUSTRALIA

Geoscience Australia continued its \$59 million five-year geoscience program. It completed a 550 km seismic reflection traverse across the Gawler and Curnamona cratons and the Arrowie Basin and a 640 km seismic and magneto-telluric transect from the northern Gawler Craton, across the Officer Basin and Musgrave Province to the Amadeus Basin. The 2007 seismic transect from Mount Isa to Croydon discovered a buried sedimentary basin (Millungera Basin), and imaged major deep crustal penetrating structures that may control mineralisation. The program also included AEM surveys in the Paterson province and the Pine Creek Inlier. Major products released: a digital 1:2.5 million map of the surface geology of Australia, 3rd edition gravity anomaly map of the Australian region, and a map of the Proterozoic mafic-ultramafic rocks of Australia. The first gamma-ray spectrometric map of Australia is to be released in early 2009.

NEW SOUTH WALES

The New South Wales Government extended the New Frontiers exploration initiative for the three years 2008 to 2011 with a budget of \$16.5 million. The minerals component will focus on areas that are both undercover and under-explored such as the Thomson province and the Delamerian Orogen that provide new exploration opportunities for gold and base metals. The program will include the acquisition of deep seismic, teleseismic and gravity data in addition to basement validation drilling, 3D mapping, mineral systems studies and hyperspectral scanning of selected drill holes.

NORTHERN TERRITORY

The BRINGING FORWARD DISCOVERY initiative is a four-year, \$14.4 million program that commenced in 2007-08. This initiative includes extensive regional gravity surveys and field-based prospectivity assessments with an emphasis on under-explored 'greenfields' regions. It also includes improvements in web-based delivery of data. The initiative has been expanded in 2008-09 with the inclusion of funding of collaborative drilling and geophysics with explorers.

QUEENSLAND

The SMART EXPLORATION and SMART MINING – FUTURE PROSPERITY programs with funding of nearly \$50 million from 2005-06 to 2009-10 are providing new data including airborne magnetic and radiometric, gravity, deep seismic, airborne hyperspectral surveys and geological mapping programs. The program includes funds for collaborative drilling with explorers, for mobilisation costs for drilling and geophysical surveys, and funds for junior mineral explorers for research and interpretation for target generation. Major collaborative programs to search for sites for carbon dioxide storage, and for geothermal energy potential, are also underway.

SOUTH AUSTRALIA

The Plan for Accelerating Exploration (PACE) is a seven-year \$30.9 million initiative to increase exploration and mineral production by ensuring that the state is regarded as a premier destination for resource exploration and investment. Following previous Memorandums of Understanding with the China National Nuclear Corporation, related to sandstone-hosted uranium geology, mechanisms were put into place for knowledge exchange with Chinese and South Australian researchers. Canadian collaborations were initiated with Geoscience BC, and with the government of Saskatchewan for investigations into sediment-hosted uranium systems. An initiative is being

established with the Yukon Geological Survey for exchanges related to breccia-related IOCG mineralisation.

TASMANIA

TasExplore is a four-year \$5.05 million program consisting of \$4.1 million for new geoscientific information and \$0.95 million for promotion of exploration opportunities. Aeromagnetic and radiometric data have been acquired over NE Tasmania and interpretive reports published. Updated geological mapping has been completed in the central North and is now published. Mapping is under way in NE Tasmania and on King Island. The aim of the project is an upgraded 3D geological model of Tasmania.

VICTORIA

The \$5 million Rediscover Victoria initiative comprises: a grants program to encourage greater minerals exploration drilling, geological understanding of Victoria's resource potential, and a 3D model of Victoria's onshore and offshore geology at a scale of 1:250 000 or better. The Gold Undercover initiative showed there is over 70 Moz of gold to be found in the Bendigo and Stawell zones. An exploration toolkit has been produced to assist gold exploration.

WESTERN AUSTRALIA

With a change in Government in late 2008, the ban on uranium mining in Western Australia was lifted and a major exploration stimulus package announced. Western Australia has many, very large and easily accessible uranium deposits, some of which could be brought into production in the next 5 years. The new five year \$80 million Exploration Incentive Scheme, part of the Royalties for Regions initiative, includes subsidies for companies drilling in greenfields areas, completion of the State's 400 m line-spacing airborne magnetics and radiometrics survey coverage, and additional support to accelerate government approvals.

COPPER, LEAD, ZINC, SILVER (FIGURE 2)

Australian copper exploration spending in 2007-08 totalled \$293.5 million with Queensland and South Australia accounting for 72.7% between them in even proportions. In the first 9 months of calendar year 2008, copper exploration spending rose by 22.6% to \$237.3 compared to the first 9 months of 2007. Lead-zinc-silver exploration rose by 33.9% to \$186.6 million in 2007-08 and was dominated by Western Australia with 19% of total spending. In the first 9 months of 2008 it fell by 17% compared to the same period of 2007.

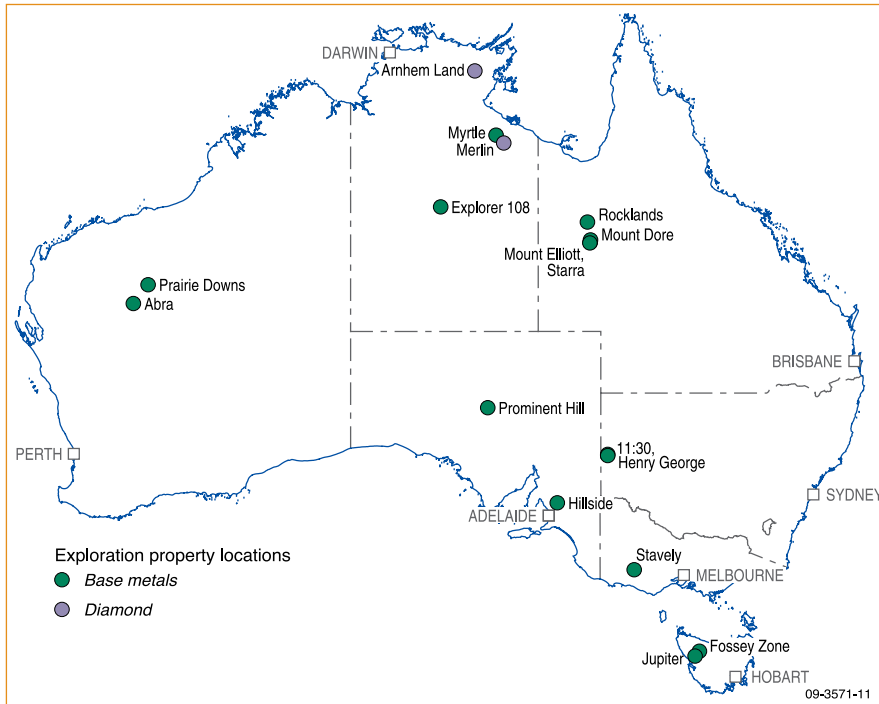


Figure 2: Selected base metal exploration projects, 2008.

New South Wales

Perilya Ltd announced initial resource estimates for the **Henry George** and **11:30** deposits in the Pinnacles region of Broken Hill. At Henry George, the company reported an Inferred Resource of 1.3 Mt @ 7.7% Zn for 100 000 t contained zinc. At the 11.30 deposit there is an Inferred Resource of 220 000 t @ 12.2% Zn for 27 000 t of contained zinc.

Sultan Corporation Ltd reported a drill intersection from its **Peelwood** prospect, 75 km S of Bathurst, of 4 m @ 3.16% Cu, 1.64% Zn, 62g/t Ag and 0.35% Pb from 30-34 m which included 1 m at 9.03% Cu, 5.43% Zn, 90.8g/t Ag and 0.35% Pb. The company announced an Inferred Resource of 259 063 t @ 2.82% Zn, 0.30% Cu, 1.28% Pb and 17g/t Ag.

Northern Territory

Rox Resources Ltd confirmed the discovery of zinc-lead mineralisation at the **Myrtle** prospect, SW of the McArthur River mine. Results included: 19 m @ 4.14% Zn, 1.34% Pb, 0.9g/t Ag, including; 5 m @ 6.03% Zn, 2.94% Pb, 1.0g/t Ag and 4 m @ 5.57% Zn, 0.49% Pb, 1.4g/t Ag. The company reported an Inferred Resource of 38 Mt @ 4.2% Zn, 1.0% Pb.

Westgold Resources Ltd announced an Inferred Resource for the **Explorer 108** prospect, near Tennant Creek, of 8.7 Mt @ 5.6% Pb+Zn, 20g/t Ag and 0.3g/t Au. Mineralisation is open in several directions and contains a higher grade component of 4.0 Mt @ 8.2% Pb+Zn, 25g/t Ag, 0.3g/t Au at a 5% Pb+Zn cut-off.

Queensland

Ivanhoe Australia Ltd announced an Indicated and Inferred Resource of 30 Mt @ 0.9% Cu and 0.8g/t Au for its **Starra** Line Project near Cloncurry. They also reported an Indicated and Inferred Resource for the **Mount Dore** project of 80 Mt @ 0.6% Cu for a contained 480 000 t Cu. At the **Mount Elliott** project, Ivanhoe reported an estimated 475 Mt @ 0.5% Cu and 0.3g/t Au for a metal inventory of 2.3 Mt Cu and 4.3 Mozs Au. Ongoing drilling at Mount Elliott returned 342 m @ 1.21% Cu and 0.80g/t Au, and 114 m @ 0.92% Cu and 0.76g/t Au.

CuDeco Ltd reported significant mineralisation in drilling at its **Rocklands** project near Cloncurry. At Las Minerale, intersections included: 133 m @ 6.13% Cu including 118 m @ 6.84% Cu; 26 m @ 4.37% Cu and 0.56g/t Au which included 11 m @ 9.17% Cu and 1.17g/t Au; and 71 m @ 3.85% Cu which included 28 m @ 5.36% Cu.

South Australia

OZ Minerals Ltd announced a major increase in resources at its **Prominent Hill** copper-gold deposit 110 km SE of Coober Pedy. The company reported a 35% increase in its copper resource to 2.5 Mt Cu, a 100% rise in gold resources to 7.4 Mozs Au and a 43% increase in silver resources to 22.6 Mozs Ag.

Rex Minerals Ltd reported a copper-gold (IOCG) discovery with 100 m of mineralisation intersected at its **Hillside** project, on the Yorke Peninsula. Intersections included: 33 m @ 0.38% Cu, <0.1g/t Au, 10% Fe, and 30 m @ 0.9% Cu, 0.22g/t Au and 15% Fe; 259 m @ 1.7% Cu, and 0.4g/t Au which included 26 m @ 4.4% Cu and 0.9g/t Au, and 75 m @ 3.3% Cu and 0.8g/t Au.

Tasmania

Drilling by Bass Metals Ltd in the **Fossey Zone**, part of the Hellyer Mine Project, returned intersections including 12.75 m @ 18.5% Zn,

8.8% Pb, 0.6% Cu, 273g/t Ag and 2.83g/t Au from 243.1 m downhole. Others included: 9.2 m @ 20.8% Zn, 8.8% Pb, 0.9% Cu, 290g/t Ag and 3.01g/t Au.

Zinifex Ltd reported that diamond drilling at the **Jupiter** prospect 5 km S of its Rosebery Mine, intersected significant mineralisation in three holes including 23 m @ 5.6% Zn, 1.1% Pb, 38g/t Ag and 0.8g/t Au from 61 m downhole. This intersection included 9.5 m @ 9.5% Zn, 2% Pb, 70g/t Ag and 1.2g/t Au.

Victoria

Beaconsfield Gold NL reported high-grade copper intersections from drilling at the Thursday's Gossan Prospect in its **Stavelly** Project 110 km W of Ballarat. Intersections include: 6.0 m @ 4.2% Cu, 0.4g/t Au, 50g/t Ag which included 1 m @ 11.2% Cu, 0.7g/t Au, 125 g/t Ag; and 7.7 m @ 4.2% Cu, 1.1g/t Au, 25g/t Ag which included 5.0 m @ 5.1% Cu, 1.4g/t Au, 25g/t Ag.

Western Australia

Abra Mining Ltd reported continuing favourable intersections from its **Abra** project 220 km N of Meekatharra. These included 65 m @ 3.9% Pb and 10g/t Ag from 597.0 m and, in a separate hole, 118.3 m @ 4.9% Pb and 18g/t Ag from 398.0 m. The deposit's current Indicated and Inferred Resource in the lead domain is 93 Mt @ 4.0% Pb and 10g/t Ag and 14 Mt @ 0.6% Cu and 0.5g/t Au in the copper-gold domain.

Prairie Downs Metals Ltd reported encouraging drill intersections from its **Prairie Downs** project, 100 km SW of Newman. The deposit has an Indicated and Inferred Resource of 4.7 Mt @ 6.3% Zn, 18g/t Ag and 1.8% Pb for contained metal of 295 000 t Zn, 2.6 Mozs Ag and 83 000 t Pb. Intersections include: 1.5 m @ 14.3% Zn, 2.3% Pb and 37g/t Ag, and 1 m @ 3.8% Zn, 0.8% Pb, and 6g/t Ag.

DIAMOND (FIGURE 2)

Australian diamond exploration spending in 2007-08 fell by 19% to \$21.7 million, its lowest level since 1986-87 and the second lowest on record. The Northern Territory accounted for \$5.6 million of total expenditure and it is estimated that Western Australia had expenditure of about \$14 million.

Northern Territory

Drilling of the PalSac and mini-bulk sampling of the Gwain kimberlites resulted in North Australian Diamonds NL increasing the Indicated and Inferred Resource at their **Merlin** Mining Project to 13.64 Mt of ore. The company reported microdiamonds in reconnaissance loam samples from Central **Arnhem Land** where all were 0.2 mm or finer.

GOLD (FIGURE 3)

Australian gold exploration spending rose by 30% in 2007-08 to \$592.7 million with 59% of it spent in Western Australia while Victoria had the second largest proportion with 10.6%. In the first 9 months of 2008 spending totalled \$449.5 million compared to \$356.2 million in the same period of 2007.

New South Wales

Newcrest Mining Ltd reported that the **Cadia East** mineral resource increased by 6.6 Mozs Au and 1.88 Mt Cu while its ore reserve rose by 5.0 Mozs Au and 1.0 Mt Cu. An initial mineral resource for **Big Cadia**, located NE of the Ridgeway mine, is estimated at 0.44 Mozs Au and 0.17 Mt Cu.

At the **McPhillamys** Prospect, 35 km SE of Orange, Alkane Resources Ltd and Newmont Australia Ltd reported an intersection of 366 m @ 1.85g/t Au.

Later drilling returned numerous high-grade intersections including 15 m @ 5.26g/t Au and lower grade intersections including 236 m @ 1.23g/t Au.

Northern Territory

Emmerson Resources Ltd reported significant results from drilling at the **West Gibbet** Prospect, 6 km W of Tennant Creek. The first hole returned 13 m @ 66.9g/t Au from 74 m including 9 m @ 95g/t Au from 74 m.

Westgold Resources Ltd advised that drilling at **Rover 1** near Tennant Creek, returned significant high-grade intersections of: 65.75 m @ 11.0g/t Au; 66 m @ 4.26g/t Au, 0.56% Cu, 0.08% Co, 0.20% Bi and 2.1g/t Ag which included 9 m @ 14.4 g/t Au; and 49 m @ 5.8g/t Au, 1.05% Cu, 0.10% Co, 0.42% Bi and 0.9g/t Ag.

Queensland

At its **Woolgar** project, 120 km N of Richmond, Strategic Minerals Corporation NL, reported an intersection of 5 m @ 39.3g/t Au at the new Big Vein target and 12 m @ 2.76g/t Au at the Big Vein No. 2 target. At the Mowbray NE area intersections included: 2 m @ 4.55g/t Au, and 2 m @ 1.71g/t Au.

From drilling to test the extensions to the **Red Dome** gold-copper-molybdenum deposit, Kagara Ltd reported an intersection of 63.45 m @ 3.14g/t Au from 1002 m. This intersection opens up the potential for the Red Dome system at depth.

South Australia

Dominion Mining Ltd reported good results from drilling at its **Challenger** mine which aimed to test the depth continuity of mineralisation. Significant intersections reported included: 12.5 m @ 13.84g/t Au from 997.5 m depth; 4.17 m @ 14.33g/t Au from 887 m; and 4.00 m @ 22.28g/t from 1005 m.

Southern Gold Ltd identified high-grade shoots at its **Golf Bore** Prospect, 40 km NE of the Challenger Mine.

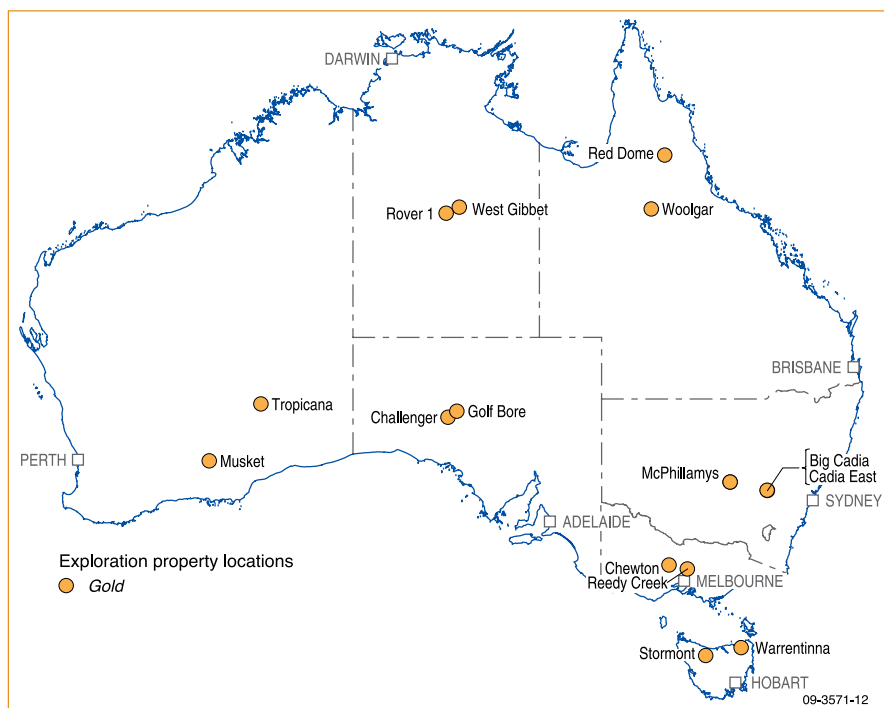


Figure 3: Selected gold exploration projects, 2008.

Intersections included: 23 m @ 3.12g/t Au from 24 m which included 9 m @ 7.65g/t Au; 13 m @ 2.44g/t Au from 29 m which included 8 m at 3.73g/t Au; and 22 m @ 2.42g/t Au from 28 m including 17 m @ 3.08g/t Au.

Tasmania

Frontier Resources Ltd reported drill intersections at the **Stormont** deposit in central N Tasmania, the best being 6.6 m @ 16.32g/t Au, 0.29% Bi and 4.8g/t Ag.

Greatland Gold plc announced results from a shallow drilling program at the **Warrentinna** goldfield in NE Tasmania. Best results were 3 m @ 2.9g/t Au within intersections of 9 m @ 2.06 g/t Au and 51 m @ 0.51g/t Au at the Derby mine and 3 m @ 2.1g/t Au at the Golden Dyke prospect.

Victoria

Castlemaine Goldfields Ltd announced an initial Inferred Resource of 2.1 Mt @ 8.3g/t Au for to 574 000 ozs Au for the **Chewton** deposit adjacent to Wattle Gully mine.

Beadell Resources Ltd announced high-grade drill intersections from its **Reedy Creek** project, 65 km N of Melbourne. At the Apollo Prospect, an intersection of 9 m @ 5.3g/t Au included 4 m @ 10.8g/t Au while in the adjacent Golden Dyke Prospect 4 m @ 4.3g/t Au was reported. Drilling between Apollo and Golden Dyke returned 20 m @ 14.5g/t Au which included 5 m @ 54.2g/t Au.

Western Australia

At the **Tropicana** joint venture, 230 km ESE of Laverton, AngloGold Ashanti Ltd and Independence Group NL announced that aircore drilling defined a 45 km anomalous gold corridor trending NE and SW from the 5 Moz Au Tropicana-Havana deposit. Rock chip sampling at Black Dragon, 30 km NE from Tropicana-Havana, returned assays including 22.2g/t Au, 16.7g/t Au and 15.9g/t Au. Follow-up sampling returned 27 samples with grades in excess of 1g/t Au including 12 samples grading over 5g/t Au which including samples at 573g/t Au, 324g/t Au, and 157g/t Au.

Avoca Resources Ltd announced the discovery of gold mineralisation at its **Musket** Prospect, 40 km SE of the Trident mine at Higginsville.

An intersection of 18 m @ 10.9g/t Au was reported. This drilling was to test shallow mineralisation defined by earlier RC drilling that included intersections of 3 m @ 9.9g/t Au; 10 m @ 2.9g/t Au, and 16 m @ 2.1g/t Au.

IRON ORE (FIGURE 4)

Spending on iron ore exploration rose by almost 58% in 2007-08 to \$449.8 million, the highest ever recorded, of which 94% was spent in Western Australia. South Australia had spending of \$19 million while the Northern Territory and Tasmania received \$3.9 million and \$4.4 million respectively.

Tasmania

Venture Minerals Ltd announced intersections in drilling at its **Mount Lindsay** magnetite prospect, 25 km SE of Savage River, which included 50 m @ 36.1% Fe, 38 m @ 38.3% Fe, and 44 m @ 29.6% Fe. The company announced an Inferred Resource for the project of 20 Mt @ 33% Fe from the No.2 Zone and an Inferred Resource from the Main Zone of 10 Mt @ 31% Fe.

South Australia

IMX Resources NL reported drill intersections from its **Cairn Hill** project, 55 km SE of Coober Pedy. Better intersections included: 10 m @ 49.71% Fe, 1.21% Cu and 0.43ppm Au from 53 m, and 15 m @ 57.75% Fe, 0.98% Cu and 0.74ppm Au from 73 m. IMX announced a Probable Ore Reserve for the deposit of 6.9 Mt at 51.2% Fe, 0.43% Cu and 0.13g/t Au.

Centrex Metals Ltd reported drill results and a resource estimate for its **Wilgerup** hematite deposit. Intersections included: 20 m @ 62.39% Fe, 2.80% SiO₂, 2.57% Al₂O₃, 0.125% P; and 44 m @ 63.23% Fe, 2.43% SiO₂, 1.66% Al₂O₃, 0.203% P. The resource is: Indicated Resources of 13.2 Mt @ 57.7% Fe, 4.9% SiO₂, 2.8% Al₂O₃, 5.1% LOI, 0.5% P, and an Inferred Resource of 0.75 Mt @ 56.0% Fe, 5.5% SiO₂, 2.6% Al₂O₃, 5.1% LOI and 0.53% P.

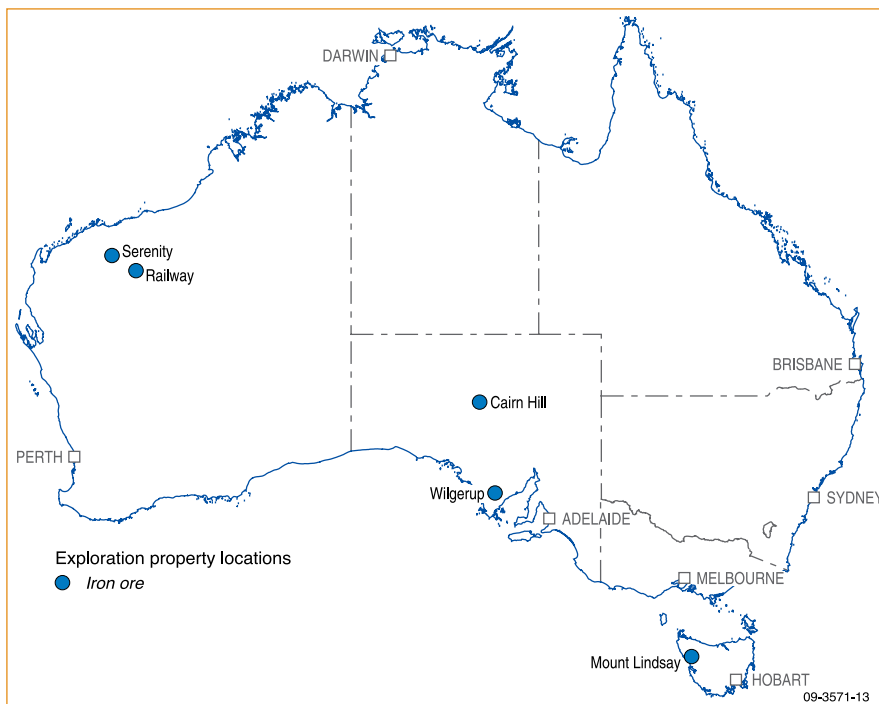


Figure 4: Selected iron ore exploration projects, 2008.

Western Australia

Fortescue Metals Group Ltd announced a ore discovery at its Solomon project, 60 km NNW of Tom Price in the Pilbara region. They reported an Inferred Resource at the **Serenity** area of 1.01 Bt @ 56% Fe, 7.3% SiO₂, 3.8% Al₂O₃, 0.81% P which includes a Channel Iron Deposit resource of 337 Mt @ 56.7% Fe, 6.3% SiO₂, 2.9% Al₂O₃, 0.079% P and 9.2% LOI. Fortescue also announced an Inferred Resource for the Solomon East, predominantly Channel Iron Deposits, of 702 Mt @ 55.9% Fe, 6.6% SiO₂, 3.0% Al₂O₃, 0.61% P and 9.1% LOI.

United Minerals Corporation NL reported drill intersections in Marra Mamba iron ore at its **Railway** prospect, 330 km S of Port Hedland including 100 m @ 61.1% Fe, 80 m @ 64.4% Fe, and 57 m @ 63.1% Fe. The company reported an Inferred Resource of high-grade Direct Shipping Ore (DSO) of 84.5 Mt @ 60.15% Fe, 3.65% SiO₂, 2.46% Al₂O₃, 0.061% P and 7.33% LOI within a total Inferred Resource of 111.3 Mt @ 57.7% Fe, 5.13% SiO₂, 3.53% Al₂O₃, 0.061% P and 8.06% LOI.

MANGANESE (FIGURE 5)

South Australia

Monax Mining Ltd reported that drilling at its **Waddikee project**, on the Eyre Peninsula was successful as drilling at the Jamieson Tank prospect returned: 5 m @ 19.9% Mn which included 2 m @ 34.0% Mn; and 22 m @ 12.4% Mn which included 4 m @ 22.3% Mn. At Pollinga, 8 km north of Jamieson Tank, drill intersections included 4 m @ 14.5% Mn and 6 m @ 16.3% Mn.

Western Australia

In 2007, AusQuest Ltd intersected 3.9 m @ 47.5% Mn at a depth of 286 m at its **Table Hill** project, 200 km SE of Newman. Subsequent drilling confirmed manganese mineralisation with one hole returning 9.3 m of massive and disseminated manganese mineralisation. Drill intersections reported included 4.5 m @ 13.3% Mn and 1.3 m @ 47.7% Mn.

At Spitfire Resources Ltd's **South Woodie Woodie** prospect drilling intersected near-surface manganese in most holes completed in the Southern Target Area with results from drilling at Tally-Ho including 6 m @ 20.48% Mn including 1 m @ 36% Mn; 7 m @ 21.8% Mn and 4 m @ 15.8% Mn.

MINERAL SANDS (FIGURE 5)

Mineral sands exploration spending fell slightly in 2007-08 to \$37.1 million, just below the record of \$37.4 million established the previous year. Of the total, \$14.7 million was spent in Western Australia, \$7.8 million in Victoria, \$6.6 million in New South Wales and \$6.2 million in South Australia.

South Australia

Iluka Resources Ltd reported the discovery of the Oolabinna mineralisation. It's most northern occurrence of HM, the **Mojave** prospect is 100 km N of Penong. At Mojave, drilling intersected HM sands over an apparent width of 1.0 to 3.5 km and a strike length of 8 km. Mineralisation averages 10 m thick from an average depth of 15 m. The HM grade ranges from 1% HM up to a maximum of 22.2%.

Western Australia

Image Resources NL reported that drilling had extended the strike length of the **Helene** mineralisation at Cooljarloo North to over 11 km. The high-grade drill intersections recorded include: 4 m @ 14.4% HM; 4 m @ 13.4% HM, and 2 m @ 19.0% HM. Total resources at Cooljarloo North are 260 Mt @ 2.4% HM.

Diatreme Resources Ltd announced an Inferred Resource for the **Cyclone** Deposit in the Eucla Basin, of 60.0 Mt @ 3.1% HM for 1.8 Mt of contained HM. The company also announced the discovery of mineralisation 4.5 km wide over a strike length of 8 km on its Wanna East tenement directly to the east of Cyclone.

MOLYBDENUM (FIGURE 5)**Queensland**

Ivanhoe Australia announced the discovery at its **Mount Dore** project, near Cloncurry, of high-grade molybdenum and rhenium mineralisation referred to as the Merlin Project. Drilling indicates a clearly defined, high-grade body of molybdenum and rhenium sulphide mineralisation from a depth of 100 m. Intersections included: 67 m @ 1.28% Mo, 29.2g/t Re and 0.13% Cu from 220 m including 10 m @ 6.73% Mo, 150.7g/t Re and 0.52% Cu from 230 metres; 59 m @ 0.67% Mo, 13.3g/t Re and 0.17% Cu from 213 m; and 32 m @ 0.41% Mo, 14.3g/t Re and 0.11% Cu from 166 m.

Aussie Q Resources Ltd announced high-grade molybdenum intercepts from the **Whitewash** prospect in central Queensland. Intersections included: 143 m @ 0.1% Mo and 0.07% Cu from 10 m which included 19 m @ 0.48% Mo and 0.08% Cu from 64 m. The company released an Inferred Resource estimate for Whitewash of 68.5 Mt @ 0.033% Mo, 0.10% Cu, 1.2g/t Ag.

Western Australia

Moly Mines Ltd announced a 43% increase in the **Spinifex Ridge** project's Proven and Probable Ore Reserves to 451 Mt @ 0.05% Mo and 0.08% Cu from a Measured and Indicated Resource of 652.2 Mt @ 0.05% Mo, 0.08% Cu and 1.3g/t Ag. There is also an Inferred Resource of 399 Mt @ 0.04% Mo, 0.07% Cu.

Victoria

Dart Mining NL announced that molybdenite mineralisation was visible in three drill holes on its **Unicorn** prospect 100 km ESE of Albury. Assays include 44 m @ 584ppm Mo, and 88 m @ 1709ppm Cu.

NICKEL (FIGURE 5)

Nickel exploration spending surged by 67% to \$303.3 million in 2007-08 in response to high metal prices and strong demand. Western Australia

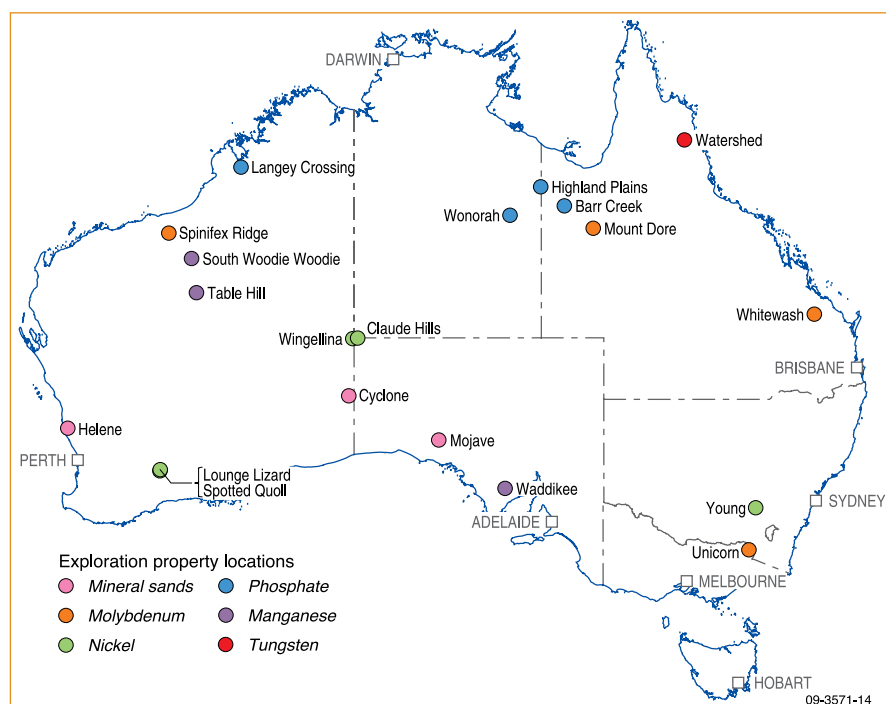


Figure 5: Selected mineral exploration projects, 2008.

dominated spending with 92% of the total and was followed by Tasmania with 7.4% where spending would have been closely associated with activity around the Avebury deposit.

New South Wales

Jervois Mining Ltd reported the results of infill drilling on its **Young** deposit near the town of Young. Assays included: 5 m @ 1.17% Ni and 260ppm Co which included 3 m @ 1.48% Ni and 200ppm Co; and 9 m @ 0.96% Ni and 630ppm Co which include 2 m @ 1.12% Ni.

South Australia

Metals X Ltd reported exploration of the **Claude Hills** deposit on the South Australian side of the border continued. Drilling with Western Australia intersected nickeliferous limonites under transported sands and initial assay data have been encouraging with results including: 60 m @ 1.20% Ni, 0.11% Co, 61.4% Fe₂O₃; 36 m @ 1.12% Ni, 0.11% Co, 55.3% Fe₂O₃; and 40 m @ 1.32% Ni, 0.18% Co, 58.0% Fe₂O₃.

Western Australia

Western Areas NL announced that at the **Spotted Quoll** deposit near its Flying Fox mine drilling continued to yield positive results including: 12 m @ 9.6% Ni from 49 m down hole; 5 m @ 6.2% Ni from 51 m and 20 m @ 5.5% Ni from 43 m down hole. The company announced a 67% increase in resources at Spotted Quoll to 2.02 Mt @ 6.2% Ni for a contained 125 460 t Ni.

Kagara Ltd announced that drilling at the **Lounge Lizard** deposit near Western Areas' Flying Fox mine returned intersections including 33.46 m @ 5.30% Ni. Subsequent drilling included 140.27 m @ 1.5% Ni which included 26.27 m @ 3.6% Ni. The resource estimate for Lounge Lizard 103 300 t Ni and includes a high grade resource of 1.149 Mt @ 4.62% Ni.

PHOSPHATE (FIGURE 5)

Northern Territory

Minemakers Ltd announced a resource upgrade at the **Wonarah** deposit in the Georgina Basin. The Main Zone deposit Inferred Resource estimate quadrupled to 330 Mt @ 18.9% P₂O₅. The adjacent Arruwurra deposit has an Inferred Resource of 131 Mt @ 18.6% P₂O₅.

Phosphate Australia Ltd reported that drilling at its **Highland Plains** project, 311 km NW of Mount Isa, returned results including 11 m @ 27.2% P₂O₅, 3.9% Fe₂O₃, 4.3% Al₂O₃, 36.6% CaO, 0.2% MgO and 21.9% SiO₂ with a higher grade zone of 6 m @ 30.2% P₂O₅, 3.1% Fe₂O₃, 3.3% Al₂O₃, 40.7% CaO, 0.1% MgO and 17.5% SiO₂.

Queensland

Uramet Minerals Ltd announced that rock chip samples taken from the D-Eight, and Lancewood prospects in its **Barr Creek** project, 120 km N of Mount Isa returned high-grade phosphate analyses. Assay results of outcropping rock contain up to 31.2% P₂O₅ at D-Eight, and 32.8% P₂O₅ at Lancewood.

Western Australia

Heron Resources Ltd reported results of seven samples from a nodular phosphate horizon at the **Langey Crossing** project, 41 km S south of Derby, including 22.5% P₂O₅, 4.0% FeO, 3.9% Al₂O₃, 30.2% SiO₂.

TUNGSTEN (FIGURE 5)

Vital Metals Ltd announced a new resource estimate for the **Watershed** deposit in North Queensland. The deposit's total resource was estimated at 32.75 Mt @ 0.20% WO₃ for 65 600 t contained WO₃. Ongoing drilling returned intersections including: 1 m @ 4.30 % WO₃ from 69 m; 3 m at 0.70% WO₃ from 56 m and 1 m at 5.23% WO₃ from 168 m.

URANIUM (FIGURE 6)

Uranium exploration spending more than doubled in 2007-08 to \$231.6 million with 51% spent in South Australia. This spending was a record exceeding the previous peak established in 1981-82. The rapid rise in uranium exploration comes on the back of a substantial number of new companies floated in the last few years specifically to undertake such work.

Northern Territory

Energy Metals Ltd reported that chemical analysis confirmed downhole gamma probe intercepts at **Bigryli**, 330 km NW of Alice Springs. They returned intersections of: 6 m @ 0.26% U₃O₈ and 0.79% V₂O₅; 5 m @ 0.48% U₃O₈ and 0.50% V₂O₅; and 4 m @ 0.44% U₃O₈ and 1.22% V₂O₅. Bigryli contains 23.4 million pounds of U₃O₈ and 43.7 million pounds of V₂O₅.

Haddington Resources Ltd announced drill intercepts at the **Liberator** prospect in their Shoobridge project in the southwestern Pine Creek Orogen including 3 m @ 6.05% U₃O₈ and 6 m @ 1.34% U₃O₈.

Queensland

Fusion Resources Ltd announced significant drill intersections at the Duke Batman and Honey Pot prospects in the **Valhalla North** project in northwest Queensland. Intersections at Duke Batman included 14 m @ 1595ppm U₃O₈; 4 m @ 1237ppm U₃O₈; and 12 m @ 732ppm U₃O₈.

At Honey Pot, intersections of 17 m @ 1294ppm U₃O₈; 10 m @ 1357ppm U₃O₈, and 8 m @ 1200ppm U₃O₈ were reported. The company announced an Indicated and Inferred Resource for these deposits of 4.67 Mt @ 690ppm U₃O₈ for a contained 7.06 million pounds of U₃O₈.

Summit Resources Ltd announced resource estimates for its **Bikini** and **Skal** deposits, near Mount Isa. Bikini has an Inferred Resource of 10.1 Mt @ 517ppm U₃O₈ for a contained 11.5 million pounds of U₃O₈. The Inferred Resource at Skal is 7.6 Mt @ 508ppm U₃O₈ for a contained 8.5 million pounds U₃O₈.

South Australia

The **Four Mile** uranium project, 550 km N of Adelaide and 8 km, is a joint venture between Quasar Resources Pty Ltd (75%) and Alliance Resources Ltd (25%). In September, Quasar notified a decision to mine using ISR technology, with production commencing in January 2010. At the Four Mile West prospect there is an Inferred Resource of 32 million pounds U₃O₈ and drilling is expanding the area of high-grade mineralisation. Intersections reported included: 2.5 m @ 0.33% pU₃O₈, 7.0 m @ 1.27% pU₃O₈, and 0.9 m @ 1.00% pU₃O₈.

The **Honeymoon** Uranium mine with a resource of 2900 t U₃O₈ is located 400 km NE of Adelaide. Uranium One announced an agreement with Mitsui & Co., Ltd. of Japan that will see Mitsui fund the ongoing development of the project to commercial which is expected to commence in 2010.

Western Australia

Toro Energy Ltd reported an increase in resources in the **Lake Way – Centipede** uranium mineralisation, near Wiluna. The resource increased to 25.8 Mt @ 420ppm U₃O₈ for 10 835 t of contained U₃O₈ at a 200ppm cut off. The Centipede deposit resource increased with 90% of the deposit now Indicated Resources with 11.5 Mt @ 460ppm U₃O₈ for 4 542 t of contained U₃O₈.

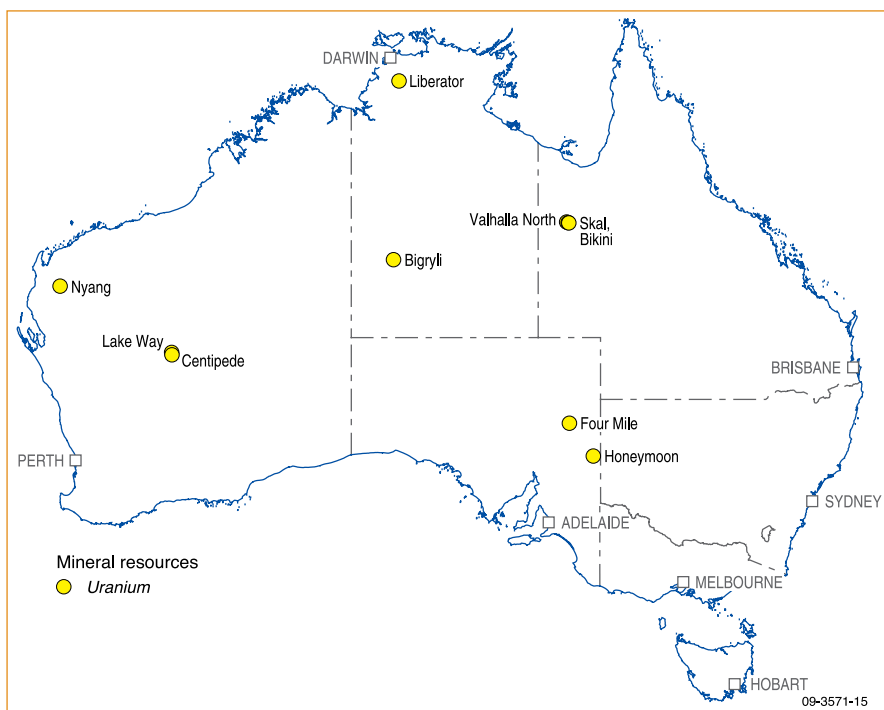


Figure 6: Selected uranium exploration projects, 2008.

Carbon Energy Ltd reported that drilling at its **Nyang** project, 210 km NE of Carnarvon, confirmed palaeochannel uranium mineralisation. Significant intersections reported included: 9 m @ 635ppm U_3O_8 which included 2 m @ 1427ppm U_3O_8 ; 13 m @ 278ppm U_3O_8 which included 2 m @ 734ppm U_3O_8 , and 4 m @ 839ppm U_3O_8 which included 2 m @ 1432ppm U_3O_8 .

DEVELOPMENTS

COMPLETED PROJECTS (FIGURE 7)

The Australian Bureau of Agricultural and Resource Economics (ABARE) reported that over 12 mining projects (excluding coal) came into production during 2008. Some of these are summarised below. A comprehensive review

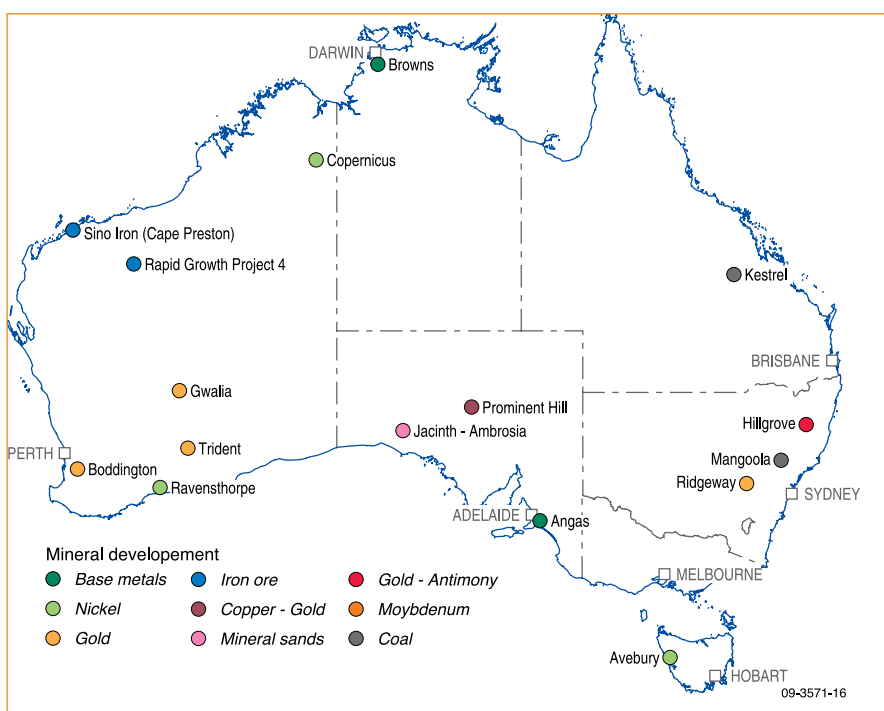


Figure 7: Selected mineral development projects 2008.

of completed projects may be obtained at the ABARE website at www.abare.gov.au.

Base metals

» Compass Resources NL announced that the first production of copper from its **Browns** Oxide Project S of Darwin in the Northern Territory and Terramin Australia Ltd shipped the first zinc concentrate from its new **Angas** mine, SE of Adelaide, South Australia.

Gold

» St Barbara Ltd commenced gold production at its Leonora operation in Western Australia from the redeveloped **Gwalia** underground mine. Avoca Resources Ltd commenced gold production at the **Trident** mine at Higginsville, Western Australia. Straits Resources Ltd opened its **Hillgrove** mine in New South Wales and plans to produce 20 000 ozs Au, 10 000 t Sb and 30 t W annually

Nickel

» BHP Billiton Ltd commissioned the \$2.4 billion **Ravensthorpe** project in Western Australia but has announced that operations will cease in mid-2009. The **Avebury** mine in Tasmania was commissioned in August and produced 10 381 t of nickel concentrate before OZ Minerals Ltd placed it on care and maintenance at the end of the year. Thundelarra Exploration Ltd and Panoramic Resources Ltd started mining at the **Copernicus** mine in the Kimberley Region of Western Australia in July but later placed the operation on care and maintenance.

DEVELOPING PROJECTS (FIGURE 7)

ABARE reported that at the end of October 2008 there were 31 metal mining projects at an advanced stage of developments at a total capital cost of approximately \$23 billion. A summary of selected projects follows and a comprehensive review of developing mining projects may be obtained at the ABARE website at www.abare.gov.au.

Base metals

- » OZ Mineral Ltd's \$1.1 billion **Prominent Hill** project SE of Coober Pedy in South Australia is scheduled to have an annual production of 90 000 t Cu in concentrates, 115 000 oz Au and 420 000 oz Ag from early 2009.

Coal

- » Rio Tinto aims to produce 1.7 Mtpa of coking coal from the **Kestrel** project, near Emerald in Queensland. The project is expected to cost some \$1.17 billion. In New South Wales, Xstrata Coal's \$1.1 billion **Mangoola** (Anvil Hill) open cut mine development near Muswellbrook is scheduled to produce 10.5 Mtpa of thermal coal from 2011.

Gold

- » Newmont Mining Corp and AngloGold Ashanti Ltd's \$3 billion redevelopment of the **Boddington** mine S of Perth, Western Australia is anticipated to produce 0.6-0.7 Mozs Au per year from around mid-2009. At Orange, New South Wales, Newcrest Mining Ltd is expanding capacity at its **Ridgeway** operation to produce some 180 000 ozs Au and 22 000 t Cu annually.

Iron ore

- » BHP Billiton Ltd's \$2.5 billion **Rapid Growth Project 4** in the Pilbara Region of Western Australia will add 26 Mtpa to the company's iron ore production capacity.

- » CITIC Pacific Mining's \$5.2 billion **Sino Iron** project at Cape Preston, in the Pilbara Region, Western Australia, will have a production capacity of 27 Mtpa iron ore pellets and concentrates from about 2009.

Mineral sands

- » In the Eucla Basin of South Australia Iluka Resources Ltd's Eucla Basin Mineral Sands project based on the **Jacinth** and **Ambrosia** deposits is expected to come on stream in 2010 at a cost of \$420 million. Annual capacity is expected to be around 300 000 t zircon, 160 000 t ilmenite and 30 000 t rutile.

CONTACTS FOR AUSTRALIAN GOVERNMENTS

AUSTRALIA

Geoscience Australia
GPO Box 378
Canberra, ACT 2601, Australia
Tel: +61 (0)2 6249 9087
Fax: +61 (0)2 6249 9983
Email: mike.huleatt@ga.gov.au
Web: www.ga.gov.au

**Department of Resources,
Energy and Tourism**
GPO Box 9839
Canberra, ACT, 2601, Australia
Tel: +61 (0)2 6213 6000
Fax: +61 (0)2 6213 7000
Email: Michael.Sheldrick@ret.gov.au
Web: www.ret.gov.au

NEW SOUTH WALES

**Department of Primary Industries - Mineral
Resources**
PO Box 344 Hunter Regional Mail Centre,
NSW, 2320, Australia
Tel: +61 (0)2 49316696
Fax: +61 (0)2 49316789
Email: lindsay.gilligan@dpi.nsw.gov.au
Web: www.dpi.nsw.gov.au/minerals

NORTHERN TERRITORY

**Department of Primary Industry, Fisheries and
Mines, Northern Territory Geological Survey**
PO Box 3000
Darwin, NT, 0801, Australia
Tel: +61 (0)8 8999 5313
Fax: +61 (0)8 8999 6824
Web: [www.nt.gov.au/dpifm/Minerals_Energy/
Geoscience/](http://www.nt.gov.au/dpifm/Minerals_Energy/Geoscience/)

QUEENSLAND

**Department of Mines and Energy, Geological
Survey of Queensland**
Block A 80 Meiers Road, Indooroopilly, QLD
4068, Australia Tel: +61 (0)7 3362 9365
Fax: +61 (0)7 3362 9368
Email: david.mason@dme.qld.gov.au Web:
www.dme.qld.gov.au

SOUTH AUSTRALIA

**Primary Industries and Resources South
Australia, Mineral and Energy Division**
GPO Box 1671
Adelaide, SA 5001, Australia.
Tel: +61 (0)8 8463 4153
Fax: +61 (0)8 8463 4155
Email: heithersay.paul@saugov.sa.gov.au
Web: www.pir.sa.gov.au

TASMANIA

Mineral Resources Tasmania
PO Box 56
Rosny Park, Tas 7018, Australia
Tel: +61 (0)3 6233 8377
Fax: +61 (0)3 6233 8338
Email: info@mrt.tas.gov.au
Web: www.mrt.tas.gov.au

VICTORIA

**Department of Primary Industries, Earth
Resources Division**
GPO Box 4440
Melbourne, Vic 3001, Australia
Tel: +61 (0)3 9658 4562
Fax: +61 (0)3 9658 4555
Email: Kathy.Hill@dpi.vic.gov.au
Web: www.dpi.vic.gov.au/minpet

WESTERN AUSTRALIA

**Department of Mines and Petroleum,
Geological Survey of Western Australia**
100 Plain Street,
East Perth, WA 6044, Australia
Tel: +61 (0)8 9222 3160
Fax: +61 (0)8 9222 3633
Email: rick.rogerson@dmp.wa.gov
Web: www.dmp.wa.gov.au

***Disclaimer:** Geoscience Australia has tried to make the information in this Review as accurate as possible. However, it does not guarantee that the information is totally accurate or complete. Therefore, you should not rely solely on this information when making commercial or other decisions. Information contained in this review was compiled from public domain sources. The authors acknowledge the information, comments and suggestions on the manuscript provided by colleagues in Geoscience Australia, the Department of Resources, Energy and Tourism, and various State and Northern Territory agencies.*

GeoCat: 68559

ISBN: 978-1-921498-45-9