Overview

- New South Wales (NSW) has a tin endowment (current resources and past production) exceeding 435,000 tonnes.
- Substantial resources of hardrock and alluvial tin remain, including Australia’s largest in-situ resource — Taronga.
- Many deposits have not been subjected to modern exploration techniques, providing excellent opportunities for the development of existing resources and new discoveries.

Deposit types

Tin deposits are sourced from magmatic aqueous fluids exsolved from crystallising granites. Deposits are associated with I-, S- and A-type granites and pegmatites e.g. Broken Hill region. Related granites are felsic (SiO₂ > 70%), highly evolved and enriched in incompatible elements and volatiles (F, B). Deposits are generally spatially associated with the apical portions of granites in the roof zones of batholiths and commonly display district scale metal zonation. Many NSW deposits are polymetallic and are associated with W, Ag and In.

Regional geological criteria

Areas of known tin mineralisation. Highly fractionated, felsic granites with intermediate to reduced oxidation states. Batholiths only now being unroofed or still shallowly buried.

Mineralisation features

Greisen bodies typically occur in the roof of the granites or beneath internal contacts within the granite as transgressive veins and stratabound replacements. Gangue minerals include quartz, mica, feldspars, tourmaline and topaz. Metal zonation (down temperature) is typically W → Sn → base metals. Cassiterite may occur as infill or replacement.
Alteration styles
Greisenisation, feldspar addition (K and/or Na), tourmalinisation, skarnification, chloritisation with propylitisation in more distal portions. Width of alteration zones is variable and may be absent or unnoticeable adjacent to some mineralised granites. Alteration is most pronounced in granite and overlying zones, granite flakes may be unaltered.

Prospective terranes
- Replacement deposits, massive greisens, porphyry-style stockworks.
- Targets of >50 Mt @ >0.5% Sn. Replacement deposits have the highest grade. Greisens and stockworks potentially offer the largest tonnages.
- Tin is the dominant metal, but W and Ag may also occur. Tin is typically present as cassiterite (SnO₂) providing mineralogically simple ores.
- Prospective tin areas may also contain rare earth elements, Y, In, Ta and Nb.

New England Orogen
- Tin deposits are associated with highly evolved I-type granites. Associated with polymetallic systems that include W, Mo, Ag, Pb, Zn and In.
- Most historical production (~250 000 t) was alluvial, however, significant potential hardrock resources remain (Taronga, Elsmore, Glen Eden).
- Hardrock styles include veins (single, sheeted, stockwork), disseminations, pipes and greisens.
- Good potential for buried high level granite systems in or under tin deposits that are associated with I-type granites. Some of these intrusions may contain heavy rare earth elements, which are in demand globally.

Lachlan Orogen
- Tin (~W) mainly associated with S-type granites and minor I-types.
- Wagga Tin Belt has an extensive (400 km) belt of prospective granites.
- Hardrock veins (Kikoira), breccias (Ardlethan Tin mine), greisens, carbonate replacement/skarn (Doradilla) and alluvial production.
- Good potential for buried systems under cover (e.g. Burrandana, Tara prospect).
- Substantial resources also at exist Doradilla.

Curnamona Craton
Pegmatites are widespread within the Broken Hill region. Some are highly fractionated and include the famous Be- and Li-bearing pegmatites. Around Eurowie they are associated with Sn, Ta and rare metals.

Project highlights
Taronga — Porphyry sheeted vein-hosted deposit and the largest undeveloped hard rock Sn deposit in Australia.

Current Resources
The Northern Zone at Taronga has an indicated and inferred resource of 27 Mt @ 0.15% Sn for 40 100 t contained Sn and is open at depth. Southern Zone has an indicated and inferred resource of 9.3 Mt @ 0.19% Sn for 17 100 t contained Sn, including metallurgically favourable cassiterite, along with significant Cu and Ag grades.

Ardlethan — The largest historical field in mainland Australia, with over 31 500 t of Sn produced from both alluvial and intrusive-hosted deposits.

Current Resources
Tailings — 5.6 Mt @ 0.21% for 21,600 t Sn (contained)
Waste material — inferred 21.3 Mt @ 0.09% Sn for 20 200 t Sn
Hard rock underground — global resource 5.5 Mt @ 0.45% Sn for 24 700 t Sn

Eurowie — Tin-bearing pegmatites occur in the Curnamona Province (Broken Hill region). Recent exploration success has focussed attention on the potential of these deposits for tantalum and rare metals.

Doradilla — Inferred resource of 22 300 t with a grade of 0.28% Sn. A tin laterite deposit occurs above skarn horizon. The deposit is associated with a 16 km long mineralised skarn horizon associated with a Triassic age (235 Ma) granite. This granite is a similar age and chemistry to the tin granites of the New England region.

Tallebung — Recent exploration suggests a large tonnage low grade porphyry Sn–W–Ag deposit. The lodes are positioned 200–300 m above a buried granite.

Exploration models for tin deposits in New South Wales (Blevin).

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