CHAPTER 16 OPAL

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OPAL

More than 95% of the World's precious opal comes from South Australia, New South Wales and Queensland. During the 1990s, the value of South Australia's annual production of rough opal averaged ~ $40 million, which is about half of the total Australian production.

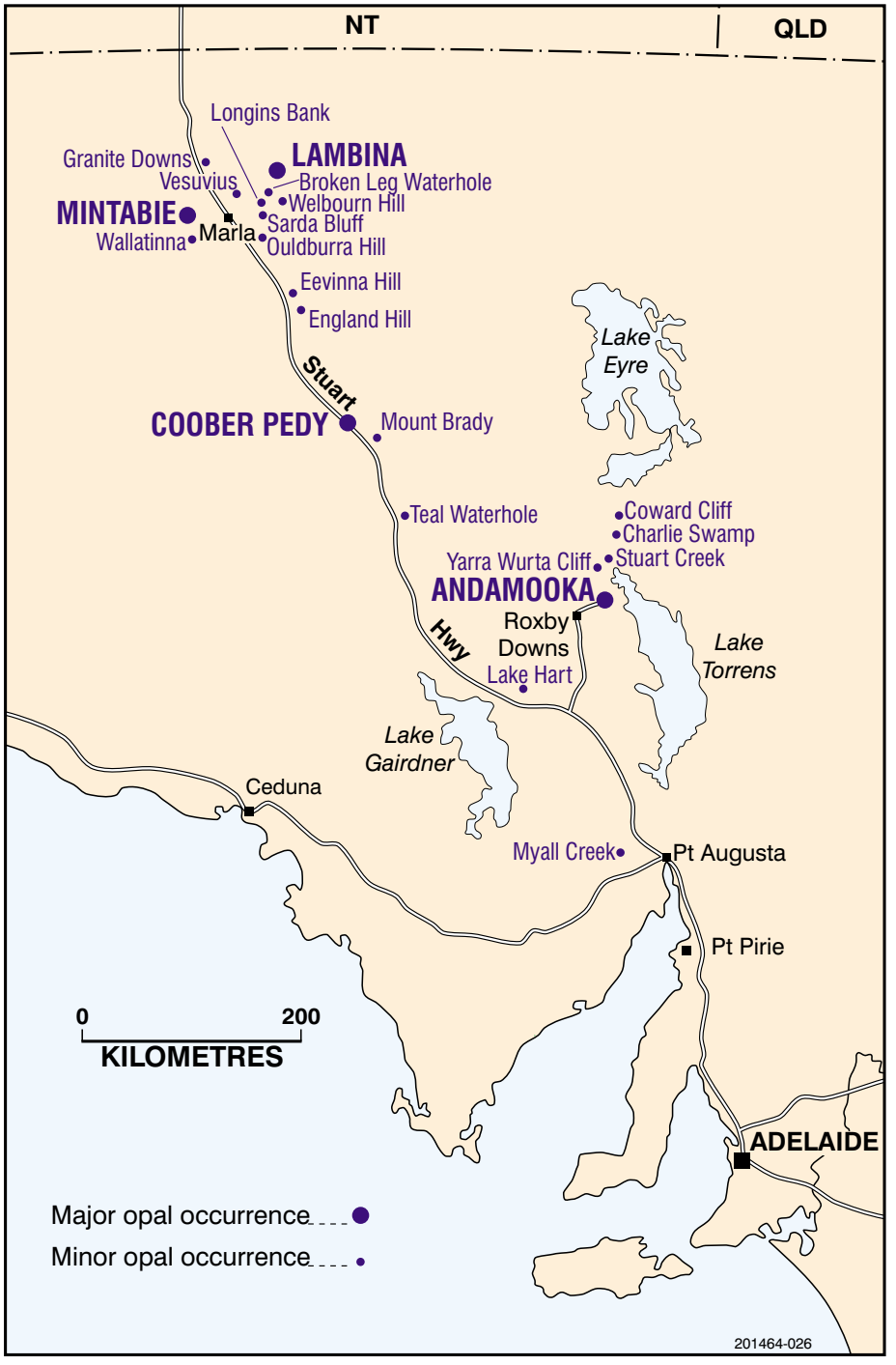
Most of South Australia's opal is sold in the rough on the opal fields and mainly exported to Hong Kong, Taiwan and China for cutting and marketing. However, much of the State's top quality opal is cut in Australia, generally increasing its value four to five fold.

Opal production has been steadily decreasing, and in 2001 was estimated at $35.6 million, with the bulk coming from **Lambina** and **Coober Pedy**, with lesser amounts from **Andamooka** and **Mintabie** (Fig. 16.1).

Most of the opal is believed to have been emplaced 15–20 million years ago when Cretaceous sediments in the Great Artesian Basin, and Palaeozoic and older rocks near its margins, underwent deep weathering and alteration to kaolin. Soluble silica released during this process percolated downwards in groundwater through faults, joints, fractures and other discontinuities. It precipitated as a gel composed of silica spheres, which hardened and cemented together during a slow drying process within a zone of fluctuating watertable levels. In some areas, impermeable clay lenses or fossils formed favourable sites for the deposition of opal.

Opal, discovered at **Coober Pedy** in 1915 (Barnes et al., 1992), occurs in weathered Early Cretaceous Bulldog Shale (~50 m thick), locally termed *sandstone.* In the weathered zone, the Bulldog Shale is a bleached white or varicoloured, silty or sandy claystone, with kaolinite as the dominant clay mineral. Below the *sandstone,* the profile changes to denser, less porous, mauve, grey or brown claystone, locally termed *mud.* Opal is found throughout the *sandstone* but predominantly from ~5 m above to 1 m below the change to the darker coloured *mud*, and occurs as sub-horizontal to subvertical veins infilling cracks and joints up to 100 mm thick, but generally less than 10 mm (Fig. 16.2).

At **Mintabie**, opal was discovered during 1921–22 and is the only field in Australia producing opal from Palaeozoic rocks. The *Mintabie Beds* in which the opal is found is considered to be of Ordovician age and underlies Early Cretaceous sediments. The beds dip shallowly south to southwest and comprise well-sorted, kaolinitic, white sandstone with minor claystone interbeds, and exhibit large-scale cross-bedding suggesting deposition in a fluviatile environment. There appears to be no preferred depth for opal and has been found from near surface to depths of ~30 m (Barnes et al., 1992).


NT
QLD
Longins Bank
Granite Downs
LAMBINA
Vesuvius
Broken Leg Waterhole
Welbourn Hill
MINTABIE
Sarda Bluff
Wallatinna
Marla
Ouldburra Hill
Eevinna Hill
England Hill
Lake Eyre
Stuart
COOBER PEDY
Mount Brady
Teal Waterhole
Coward Cliff
Charlie Swamp
Yarra Wurta Cliff
Stuart Creek
ANDAMOOKA
Roxby Downs
Hwy
Lake Hart
Lake Torrens
Lake Gairdner
Ceduna
Myall Creek
Pt Augusta
Pt Pirie
0
200
KILOMETRES
ADELAIDE
Major opal occurrence
Minor opal occurrence
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