

CHAPTER 15 Kimberlite — Diamond

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GAWLER CRATON

Stockdale Prospecting Ltd (now De Beers Australia Exploration Ltd) has discovered a number kimberlite bodies adjacent to the east–west structural corridor represented by the Polda Trough (Fig. 15.1). Kimberlite bodies **Mt Hope 01 to 08** close to Elliston, and one near **Cleve**, were located by drilling based on the distribution of anomalous indicator minerals in surface samples, and magnetic anomalies. Hypabyssal and crater-facies kimberlite and breccias were recorded, including altered monticellite kimberlite dated at 183 Ma. No diamonds have been recorded from this area.

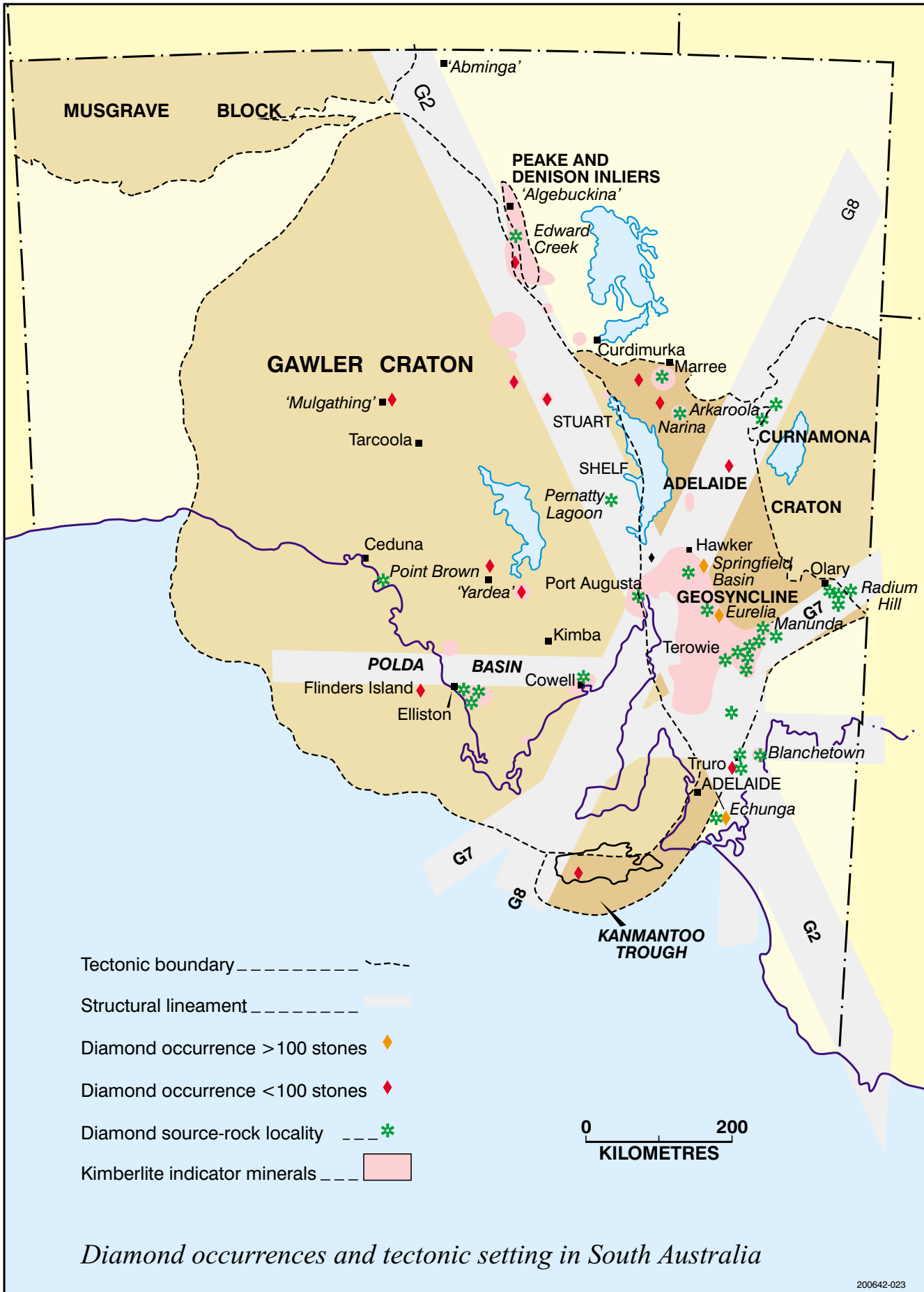
Orogenic Exploration Pty Ltd holds two exploration licences over **Flinders Island** and has an option agreement with Tawana Resources NL, which in turn has an agreement with De Beers Australia Exploration Ltd. Six small diamonds have been found along with a wide range of indicator minerals including chromite, pyrope, diopside, picroilmenite, forsterite, orthopyroxene and phlogopite (Cooper, 2002). Four distinct indicator anomalies have been defined on the island — *Gem Pan, Flinders, Monroe* and *Dunstan's* (Fig. 15.2).

Macro-diamonds and kimberlitic indicator minerals have been found on the northeastern part of the craton and within the G2 structural corridor (Fig. 15.1) The first discovery was a single ~1 ct diamond, found in alluvial gold workings in Peake Creek in 1894. In the early 1980s, Stockdale Prospecting Ltd explored the area, locating eight macro-diamonds at **Edwards Creek prospect** and two at **Reedy Lagoon prospect** along with numerous kimberlitic indicator minerals, including picroilmenite, pyrope garnet and chrome spinel, from surface and stream samples. Many indicator minerals show indications of a nearby source. One macro-diamond was enclosed within Jurassic Algebuckina Sandstone. However, no primary source rocks have been found but circular surface features, evident on aerial photographs, with coincident magnetic anomalies are present, and are being investigated by Reedy Lagoon Corp. Ltd.

Five other diamonds have been recovered in Recent sediments from widely separated sites on the Gawler Craton — three in the northern Craton at **Muckanippie, Mount Paisley** and **Curlawidny Lagoon**, and two from the Gawler Ranges near the southern end of **Lake Gairdner** (Townsend et al., 1994).

ADELAIDE GEOSYNCLINE AND KANMANTOO TROUGH

Diamonds and their kimberlitic source rocks are widely distributed over the state. They are most prevalent within the Adelaide Geosyncline and show a general association with major structural corridors (Minerals and Energy Resources South Australia, 2001; Fig. 15.1).



Diamond occurrences and tectonic setting in South Australia