



NSW DEPARTMENT OF  
**PRIMARY INDUSTRIES**

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## Potential and Outlook

Although New South Wales does not appear to have significant potential for large jade deposits of commercial value, small deposits may be associated with serpentinite belts, particularly the Great Serpentine Belt, in the northeast of the state (Figure 6).

The size of known jade deposits in New South Wales is very small compared with the high-grade deposits at Cowell in South Australia, which dominate world production.

## Nature and Occurrence

Jade consists of two distinct minerals, nephrite and jadeite —  $\text{Ca}_2(\text{Mg,Fe})_5(\text{OH})_2[\text{Si}_8\text{O}_{22}]$  and  $\text{Na}_2(\text{Al,Fe})_2[\text{Si}_4\text{O}_{12}]$  respectively. Nephrite is a member of the tremolite–actinolite series of the amphibole group. Jadeite is a clinopyroxene (MacNevin & Holmes 1980).

Nephrite (also known as greenstone) is the toughest natural jade mineral owing to the development of an interlocking felted mass of fibrous monoclinic crystals (Webster 1976). Jadeite is an aggregate of inter-locking monoclinic crystals which are more granular than fibrous.

Most known deposits occur as lens-shaped bodies at or near the faulted margins (commonly sheared) of hydrothermally altered serpentinites. Examples of this type of deposit are found in New Zealand, Canada, Taiwan, Guyana, Surinam, southern Europe, Russia and China.

The Cowell deposits in South Australia occur as elongate lenses within metamorphosed dolomitic marble and banded calcsilicate rocks of Early to Middle Proterozoic age that have undergone retrograde alteration during deformation (Flint & Dubowski 1990).

Australia is the major world producer of jade, with exports of nephrite almost entirely supplied from Cowell, in South Australia. Other significant producers are New Zealand, Canada and Taiwan. Burma is the main source of jadeite.

## Main Australian Deposits

The nephrite deposits at Cowell are the largest in the world. There are over 100 occurrences within an area of about 10 km<sup>2</sup>, containing inferred reserves of 80 000 tonnes of nephrite, about 90% of the world's reserves (Flint & Dubowski 1990). Cowell jade varies in colour and texture, but does not include the apple and emerald-green colours of some overseas deposits. Three main varieties are marketed — green nephrite, black nephrite and premium black nephrite.

## New South Wales Occurrences

There are five recorded nephrite occurrences associated with the Great Serpentine Belt in north-eastern New South Wales (Figure 6) (MacNevin & Holmes 1980; Ray et al. 2003). Deposits are located near Tamworth; at Ogunbil; Spring Creek; Mulla Creek; and Opossum Gully (Nundle).

About 600 kg of nephrite was obtained between 1977 and 1996 from deposits in New South Wales.

The deposits are lens-shaped bodies and steeply dipping elongated pods occurring along the margins of serpentinite bodies, and associated with tremolite, actinolite and talc. The nephrite probably formed by hydrothermal alteration of foliated serpentinite close to its sheared margin.

Nephritic jade has also been identified in thin sections from rocks collected in northeastern New South Wales at Boro Creek near Inverell, at Walcha; near Port Macquarie; and in central New South Wales near Mount Lawson and Orange.

## Applications

Nephrite is used extensively for carving and ornamental stone. Top-quality jade can be carved with diamond-tipped tools, and polished with diamond pastes (thus achieving the characteristic final lustre). There are no rigidly enforced specifications for jade. Variations in colour and other physical properties allow jade to be used for a variety of end-products, including ornamental stone carvings (such as urns, vases and statues), and as personal jewellery.

## Economic Factors

Presently identified nephrite jade resources, particularly in South Australia, are sufficient to meet world demand for the foreseeable future (Flint & Dubowski 1990).

## References

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