Volunteer surveys for Crystal Brook star orchid - *Thelymitra magnifica*

By Jay and Bob Steer

As part of the Adopt an Orchid project run by the Western Australian Native Orchid Study and Conservation Group (WANOSCG) and the Department of Parks and Wildlife (DPaW), we undertook comprehensive monitoring and surveys in September-October 2011 and 2012 to ascertain the current conservation status of the Priority 1 species Crystal Brook star orchid (*Thelymitra magnifica*). The aims of the project were to:

- locate and survey known populations of the orchid
- learn about its preferred habitat
- locate new populations
- identify actual and potential threats
- suggest conservation measures

Crystal Brook star orchid

Crystal Brook star orchid is one of 110 species in the sun orchid genus (*Thelymitra*) found in Australia with 37 of these endemic to southwest Western Australia. Members of the genus lack a modified lip (labellum) and hence have an arrangement of similarly-shaped petals and sepals. The column (fused anthers and stigma) is highly modified and often adorned with wings and glands. All species open widely when it is warm and sunny and close when it is cool and cloudy, hence the common name sun orchid.

Sun orchids are divided into several groups of related species with Crystal Brook star orchid one of seven species in the *Thelymitra fuscolutea* group. Members of this group are characterised by their yellow to red brown flowers (with or without blotches) and their broad flattened leaves which are often found in clumps.

The scientific name of Crystal Brook star orchid elludes to its noble, eminent, stately, splendid apperance. It is a rare orchid which produces 10 to 35cm tall flower spikes, each carrying two to ten red/brown flowers 3 to 6cm wide that are often marked with yellow. The species can be found flowering in late September to mid October in a small area along the Western edge of the Darling Scarp east of Perth.

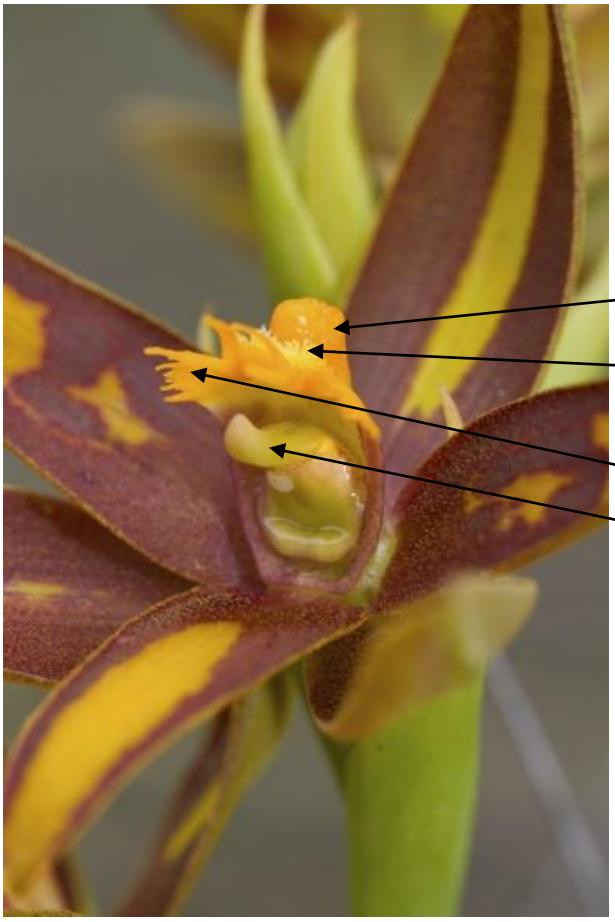
Crystal Brook star orchid leaves and buds

Crystal Brook star orchid usually occurs in the vicinity of white gums (*Eucalyptus wandoo*), often in dense heath next to Balga (*Xanthorrhoea preissii*) and two-leafed hakea (*Hakea trifurcata*). The orchid often grows on ledges of gravelly soil below granite outcrops or on sloping granitic soils.

The species bears a high degree of similarity to Star orchid (*Thelymitra stellata*). The latter flowers slightly later (late October), has a slightly smaller less open flower, a less pronounced apical projection on its column and is often found growing in lateritic soils.

Bob Steer photographing Crystal Brook star orchid

Crystal Book Star orchid column structure



Bulbous apical projection on the column (supra-anther lobe)

Dorsal surface of the post-anther lobe covered by dense mass of hairs (trichromes)

Dentate column wings on distal margins

S-shaped anther beak

Supra-anther lobe

Post-anther lobe

Anther beak

Pollinarium: pollina

Pollinarium: viscidium

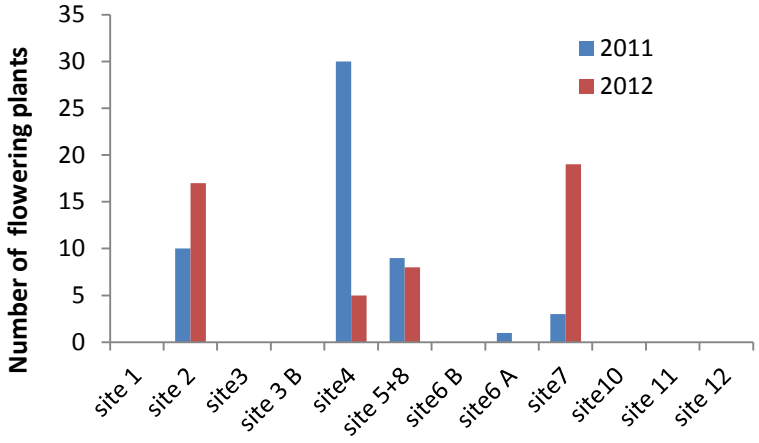
Stigma

2011 and 2012 ADORP survey

In 2011 nine sites were studied with five yielding 76 flower spikes on 53 plants. Only one plant at site four set seed in 2011. Twelve sites were surveyed in 2012, the same nine sites as in 2011 plus three additional sites. In 2012, flowering plants were only found at the four most productive sites from 2011 (62 flower spikes on 49 plants). At site four there was a dramatic fall in the number of flowering plants from 30 to five while the number of flowering plants at site two increased from 10 to 17. A new subpopulation of Crystal Brook star orchid was found at site seven, increasing the number of flowering plants known at that site from three to 19. The only plant to set seed at any of the sites surveyed in 2012 was at site two.

Threats to the survival of Crystal Brook star orchid

Whether there is currently any recruitment of new plants at any of the known Crystal Brook star orchid sites is uncertain. Based on the very limited data collected in the dry years of 2011 and 2012, recruitment is likely to be low since there appears to be little seed set. Failure to set seed could be due to loss of pollinators and or changed climatic conditions.



All populations of Crystal Brook star orchid are under threat due to their close proximity to the Perth Metropolitan area. People and orchids often have conflicting needs. Much of the former Crystal Brook star orchid habitat in the Darling escarpment has been lost to quarries and residential development and a variety of current human activities threaten existing orchid sites.

For example clearing and unplanned fires (particularly arson) close to known Crystal Brook star orchid sites have increased the likely hood of weed infestation. Fuel reduction burns during spring, at a time that might suit nearby residential areas, coincides with the growing, flowering and seed set of Crystal Brook star orchid and are likely to be detrimental to the orchids survival.

Inappropriate recreational uses of bush reserves, including trampling and erosion caused by off road vehicles (bicycles, motorbikes and cars), also impacts on orchid habitat. Grazing by rabbits and kangaroos is also a problem.

This raft of negative environmental factors together with the trend towards a dryer climate, suggest that this magnificent orchid may struggle to survive if its remaining habitat is not closely managed.

A bicycle jump ramp constructed at site four

Crystal Brook star orchid seed pods

Erosion alongside a walk track at site two