

**Advice to the Minister for the Environment, Heritage and the Arts
from the Threatened Species Scientific Committee (the Committee)
on Amendments to the list of Threatened Species
under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)**

1. Scientific name (common name)

Thelymitra sp. Kangaloon (D.L.Jones 18108) (Kangaloon Sun-orchid)

2. Reason for Conservation Assessment by the Committee

This advice follows assessment of information provided by a public nomination to list the Kangaloon Sun-orchid.

This is the Committee's first consideration of the species under the EPBC Act.

3. Summary of Conclusion

The Committee judges that the species has been demonstrated to have met sufficient elements of Criterion 2 to make it **eligible** for listing as **critically endangered**.

4. Taxonomy

Until the species has been formally published the phrase name, *Thelymitra* sp. Kangaloon (D.L.Jones 18108), is the currently accepted name (CHAH, 2007). The species has also been described as *Thelymitra kangaloonica* by Jones (2006).

5. Description

The Kangaloon Sun-orchid is a terrestrial orchid, with a flower stem growing to 56 cm high. The narrow fleshy leaf grows to 35 cm long, and has a purplish base. The plant produces two to 15 dark blue flowers with darker longitudinal veins (Jeanes unpubl.).

6. National Context

The Kangaloon Sun-orchid is endemic to New South Wales, and is known from three locations near Robertson in the Southern Highlands. The swamp habitat in which the species occurs has an extent of occurrence of 300 km² and an area of occupancy of 10 km². The three swamps are Butlers Swamp (0.125 km²), Stockyard Swamp (once known as Molly Morgan Swamp) (7 km²) and Wildes Meadow Swamp (3 km²), and are all located above what is known as the Kangaloon aquifer. The known areas of habitat occur within the *Special Area* under the *Sydney Water Catchment Management Act 1998* and require permission from the Sydney Catchment Authority for access.

7. Relevant Biology/Ecology

The Kangaloon Sun-orchid is largely self-pollinating. It flowers in late October and early November (Jones 2006).

The age of sexual maturity and life expectancy of the Kangaloon Sun-orchid is unknown but is thought to be a short-lived perennial.

The species grows in seasonally swampy sedgeland on grey silty clay loam at 600-700 m above sea level. Two of the three known locations, Butlers Swamp and Wildes Meadow Swamp, are identified in the EPBC listed *Temperate Highland Peat Swamps on Sandstone* endangered ecological community, whilst the other location, Stockyard Swamp, conforms with the description of *Temperate Highland Peat Swamps on Sandstone*, and therefore can be considered part of the listed ecological community.

8. Description of Threats

Current threats associated with the endangered ecological community in which the Kangaloon Sun-orchid occurs include inappropriate fire regimes, grazing by cattle, illegal collection, hydrology changes from road works, and drying out of swamps from climate change and suburban development.

Long-wall coal mining beneath the aquifer is a potential threat that could cause water to drain away from the swamps. This type of mining has already affected groundwater, river flows and other upland swamps elsewhere in the region.

The Kangaloon Sun-orchid is potentially threatened by the interference of the integrity of the water flows within the *Temperate Highland Peat Swamps on Sandstone* ecological community from pumping of the Kangaloon aquifer for water supply purposes. In 2007 and 2008, pumping trials were carried out at Butlers Swamp and Stockyard Swamp to establish whether there is any potential relationship between borefield operations and the swamps. These trials were completed in early 2008. The results indicate that there is no connection between the regional aquifer system and the perched water associated with the swamps, and that the swamps are rainfall dependent. However, given that the trials at each swamp were relatively short-term, being conducted over four months and three months respectively, only the ongoing monitoring of water levels by the Sydney Catchment Authority will determine long-term trends and management responses (KBR, 2008).

9. Public Consultation

The nomination used in this assessment was made available for public exhibition and comment for 30 business days. The Committee has had regard to all public comment that was relevant to the survival of the species.

10. How judged by the Committee in relation to the criteria of the EPBC Act and Regulations

The Committee judges that the species is **eligible** for listing as **critically endangered** under the EPBC Act. The assessment against the criteria is as follows:

Criterion 1: It has undergone, is suspected to have undergone or is likely to undergo in the immediate future a very severe, severe or substantial reduction in numbers

The Kangaloon Sun-orchid occurs in the *Temperate Highland Peat Swamps on Sandstone* endangered ecological community. It grows amongst tall sedges and rushes in grey silty soil, in open swamps which are seasonally wet. The orchid occurs at three locations near Robertson in the Southern Highlands of New South Wales: Butlers Swamp, Stockyard Swamp and Wildes Meadow Swamp. The total area of the three swamps is approximately 10 km².

Butlers Swamp was divided by a road many years ago, and has been reduced by approximately 60% due to draining of that section of the swamp which is located on private land. Wildes Meadow Swamp lost approximately 80% of its area to inundation from the Fitzroy Falls Reservoir (Evans 2007). Therefore the total area of known habitat has declined by more than 50% in recent years, from approximately 22 km² to 10 km².

Current threats to the endangered ecological community in which the Kangaloon Sun-orchid occurs include inappropriate fire regimes, grazing, illegal collection, hydrology changes from road works, and drying out of swamps from climate change and suburban development.

Stockyard Swamp and Butlers Swamp are both potentially threatened by drainage of water due to pumping of the aquifer beneath for water supply purposes (Evans, 2007), however results from pumping trials carried out in 2007/2008 in the Upper Nepean (Kangaloon) borefield indicate that there is no connection between the regional aquifer system and the perched water associated with the swamps (KBR, 2008). These swamps are also potentially threatened by long-wall coal mining which could cause fracturing of the aquifer. This activity would be likely to result in water draining away from the aquifer causing the peat swamps to dry out. Peat swamps that dry out completely cannot be rehydrated.

Because the total population of the Kangaloon Sun-orchid is unknown, there are no quantitative data available to judge that the species has undergone a reduction in numbers. However, the Committee judges that the species is suspected to have undergone a reduction in numbers based on the decline in habitat.

Although the Committee judges that the species is suspected to have undergone a reduction in numbers, there are insufficient data available to judge whether the reduction would be very severe, severe or substantial. Therefore, the species has been demonstrated to have not met each of the required elements of Criterion 1, and is **not eligible** for listing in any category under this criterion.

Criterion 2: Its geographic distribution is precarious for the survival of the species and is very restricted, restricted or limited

The three swamps where the Kangaloon Sun-orchid occurs are 30 km apart longitudinally and 10 km apart latitudinally, making the extent of occurrence of the Kangaloon Sun-orchid's habitat approximately 300 km². Butlers Swamp measures 0.125 km², Stockyard Swamp measures 7 km² and Wildes Meadow Swamp measures 3 km². Therefore the area of occupancy of the species' habitat is approximately 10 km². Although the population size of the Kangaloon Sun-orchid is unknown, it can be assumed that the species' extent of occurrence is less than 300 km² and area of occupancy is less than 10 km². As discussed under Criterion 1, the total area of habitat has declined by more than 50% in recent years.

As discussed under Criterion 1, current threats to the endangered ecological community in which the Kangaloon Sun-orchid occurs include inappropriate fire regimes, grazing, illegal collection, hydrology changes from road works, and drying out of swamps from climate change and suburban development.

The two main potential threats to the Kangaloon Sun-orchid are pumping of water from the aquifer beneath the swamps for water supply purposes and long-wall coal mining which could cause fracturing of the aquifer. Results from pumping trials carried out at Butlers Swamp and Stockyard Swamp in 2007/2008 as described under Criterion 1 indicate that there is no connection between the regional aquifer system and the perched water associated with the swamps. However given that the trials at each swamp were relatively short-term, being

conducted over four months and three months respectively, only the ongoing monitoring by the Sydney Catchment Authority will determine long-term trends and management responses.

With the extent of occurrence of this species estimated to be less than 300 km², and its area of occupancy estimated to be less than 10 km², and given the fragmented and restricted nature of the swamp habitat, the Committee judges the geographic distribution to be very restricted.

The Committee considers that the species has a very restricted geographic distribution, which is precarious for the survival of the species due to the variety of current threats to the ecological community in which this species occurs, and the potential threats of long-wall mining and pumping of the aquifer. Therefore, the species has been demonstrated to have met the relevant elements of Criterion 2 to make it **eligible** for listing as **critically endangered**.

- Criterion 3: The estimated total number of mature individuals is limited to a particular degree; and either**
- (a) evidence suggests that the number will continue to decline at a particular rate; or**
 - (b) the number is likely to continue to decline and its geographic distribution is precarious for its survival**

Although the estimated total number of the Kangaloon Sun-orchid is unknown, the Committee accepts that the species has a very restricted geographic distribution. The current threats to the ecological community in which the Kangaloon Sun-orchid occurs of inappropriate fire regimes, grazing, illegal collection, hydrology changes from road works, and drying out of swamps from climate change and suburban development, and the potential threats of long-wall mining and pumping of water from the aquifer beneath the swamps for water supply purposes are likely to have an impact on this species. However, there are insufficient data to estimate the total number of mature individuals. Therefore, the species has been demonstrated to have not met each of the required elements of Criterion 3, and is **not eligible** for listing in any category under this criterion.

- Criterion 4: The estimated total number of mature individuals is extremely low, very low or low**

Although the estimated total number of mature individuals of the Kangaloon Sun-orchid is unknown, the Committee accepts that the species has a very restricted geographic distribution and that the current threats to the ecological community in which this species occurs and the potential threats of long-wall mining and pumping of the aquifer are likely to have an impact on this species. However, there are insufficient data to estimate the total number of mature individuals. Therefore, the species has been demonstrated to have not met any of the required elements of Criterion 4, and is **not eligible** for listing in any category under this criterion.

- Criterion 5: Probability of extinction in the wild that is at least:**
- a) 50% in the immediate future; or**
 - b) 20% in the near future; or**
 - c) 10% in the medium-term future.**

There are insufficient data available to estimate a probability of extinction of the species in the wild over a relevant timeframe. Therefore, as the species has been demonstrated to have not met the required elements of Criterion 5, it is **not eligible** for listing in any category under this criterion.

11. CONCLUSION

Listing category

Thelymitra sp. Kangaloon (D.L.Jones 18108) (Kangaloon Sun-orchid) was nominated for inclusion in the list of threatened species referred to in section 178 of the EPBC Act. The nominator suggested listing in the endangered category of the list.

The Committee accepts that the Kangaloon Sun-orchid has a very restricted geographic distribution, which is precarious for the survival of the species due to the current threats to the *Temperate Highland Peat Swamps on Sandstone* endangered ecological community in which this species occurs of inappropriate fire regimes, grazing, illegal collection, hydrology changes from road works, and drying out of swamps from climate change and suburban development, and potential threats from long-wall coal mining and pumping of the aquifer. Therefore, the species has been demonstrated to have met sufficient elements of Criterion 2 to make it **eligible** for listing as **critically endangered**.

Recovery Plan

The Committee considers that there should not be a recovery plan for this species. The approved conservation advice for the species now provides sufficient direction to implement priority actions and mitigate against key threats. A recovery plan is not considered to be necessary at this time.

12. Recommendations

- (i) The Committee recommends that the list referred to in section 178 of the EPBC Act be amended by **including** in the list in the **critically endangered** category:

***Thelymitra* sp. Kangaloon (D.L.Jones 18108) Vic. Herbarium
(Kangaloon Sun-orchid)**

- (ii) The Committee recommends that there should not be a recovery plan for this species.

Associate Professor Robert J.S. Beeton

Chair

Threatened Species Scientific Committee

13. References cited in the advice

Council of Heads of Australian Herbaria (CHAH) (2007). Review of Australian vascular plant names – report to Department of the Environment and Water Resources.

Evans WR (2007). Report on the connectivity between Butlers Swamp and the regional groundwater system of the Upper Nepean area.

Jeanes J (unpubl.). Circumscription of *Thelymitra kangaloonica* Jeanes *sp. nov.*

Jones DL (2006). A Complete guide to the native orchids of Australia including the island territories. New Holland Publishers, Australia.

Kellogg Brown & Root Pty Ltd (KBR) (2008). Upper Nepean (Kangaloon) Borefield Environmental Assessment, prepared for Sydney Catchment Authority, Sydney.