

**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 cyanapicata (Dark-tipped Sun-orchid)

2. Reason for Conservation Assessment by the Committee

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

The Dark-tipped Sun-orchid is listed as endangered in South Australia under the *National Parks and Wildlife Act 1972*.

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 Criteria 2 and 3 to make it **eligible** for listing as **critically endangered**.

The Committee judges that the species has been demonstrated to have met sufficient elements of Criterion 4 to make it **eligible** for listing as **endangered**.

The highest category for which the species is eligible to be listed is **critically endangered**.

4. Taxonomy

The species is conventionally accepted as *Thelymitra cyanapicata* (Jeanes 2004; SA Herbarium 2007b). Its common name is Dark-tipped Sun-orchid (Jones 2006). It is also known as the Blue Top Sun-orchid (Bates 2007).

5. Description

The Dark-tipped Sun-orchid is a terrestrial orchid, with a flower stem growing to 30 cm high. The very narrow leaf grows to 22 cm long, and has a purplish base. The plant produces one to three small blue flowers with small, dense hair tufts (Jeanes 2004; Jones 2006; Bates 2007).

6. National Context

The Dark-tipped Sun-orchid is endemic to South Australia, and is known from three populations in close proximity on the Fleurieu Peninsula (SA Herbarium 2007a), with an extent of occurrence of approximately 1 km² and an area of occupancy of 0.01 km² (DEH 2007a; SA Herbarium 2007a).

This species was first recognised as a distinct species in the 1960s when it was found to be common in Kuitpo Forest (Knott Hill site) (Bates 2007, pers. comm.). It was recorded flowering at Knott Hill in 1991, where one flowering plant was found. Targeted surveys for the Dark-tipped Sun-orchid were undertaken in 2006 and 2007 by the Department for Environment and Heritage, ForestrySA, the Threatened Plant Action Group and the Native Orchid Society of South Australia. The 2006 survey failed to find the species after the site

was cleared and ploughed in preparation for pine planting (Quarmby 2007, pers. comm.). However, when surveyed in October 2007, two sites were identified with a total of 129 mature flowering plants (DEH 2007a).

These two populations are on ForestrySA land. Knott Hill #1 population, with 13 flowering plants identified in spring 2007 (DEH 2008; ForestrySA 2008), is approximately 3 km north-west of Kuitpo Forest Headquarters (DEH 2007a). Knott Hill #2 population was first found in October 2007 with 116 flowering plants (DEH 2008; ForestrySA 2008), and is 1.1 km north-west of Knott Hill #1 population and approximately 4 km north-west of Kuitpo Forest Headquarters (Quarmby 2007, pers. comm.).

The third population is known from private land along Peters Creek Road, approximately 2.5 km north-west of Kuitpo Forest Headquarters and about 350 m south-west of Knott Hill #1 population. The species was last recorded there in 1988, when more than 100 flowering plants were found. The understorey has been grazed out by cattle and adjacent areas planted with pines. It is likely that the species no longer exists at this site (Bates 2007, pers. comm.).

It is possible that the Dark-tipped Sun-orchid occurred in other swamps on the Fleurieu Peninsula that have since been cleared or degraded (Bates 2007, pers. comm.).

7. Relevant Biology/Ecology

The Dark-tipped Sun-orchid flowers in October and November, and flowers only open in warm, humid weather. It is strongly self-pollinating, but is probably also pollinated by small native bees, which are attracted by floral mimicry. It reproduces only by seed (Bates 2007). Like most terrestrial orchids, sun-orchids are known to form symbiotic relationships with mycorrhizal soil fungi, which are necessary for successful seed germination and plant growth (Jones 2006).

The age of sexual maturity of the Dark-tipped Sun-orchid is unknown, but other similar species take three to five years to flower (Bates 2007). Life expectancy is also unknown, but based on studies of other terrestrial orchids, it is likely to have a life span of more than 10 years (DEH 2007b). Mature plants can remain dormant underground for several consecutive years, similar to most other terrestrial orchids (Jones 2006).

The species is known from low-lying seepages, creeks and swamps with wet sandy soils, occurring in *Eucalyptus viminalis* / *Eucalyptus obliqua* open swampy woodland with a dense understorey of tea-tree, sedges, rushes and ferns, including *Leptospermum continentale* (Prickly Tea-tree), *Melaleuca decussata* (Totem Poles), *Acacia melanoxylon* (Blackwood), *Viminaria juncea* (Native Broom), *Gahnia sieberiana* (Saw Sedge), *Chorizandra enodis* (Black Bristlerush), *Juncus* sp. (Rush) and *Sphaerolobium vimineum* (Leafless Globe-pea) (Quarmby 2007, pers. comm.). The extent of suitable habitat has been extensively reduced through clearance for agriculture and forestry (Bates 2007, per. comm.). The quality of the remnants has been severely degraded over the last 15 years due to forestry practices, grazing and weed invasion (Quarmby 2007, pers. comm.).

8. Description of Threats

While ForestrySA has introduced mitigation measures, the Dark-tipped Sun-orchid is potentially threatened by forestry practices including aerial herbicide spraying, fertilizer use and pine plantation, as well as grazing by rabbits and hares, and weed invasion.

In the 1950s, both Knott Hill sites were cleared and planted with pines. The pines failed in the wet swampy areas, and the native vegetation regenerated. However, in 2007 both sites were cleared and prepared for re-planting with pines, using current forestry practices of ripping and

herbicide spraying, which includes application of a buffer zone around the two Knott Hill sites. Examination of these sites in 2007 found no adverse effect on the plants. The Knott Hill #1 site was deeply ripped and furrowed and planted with pines, but pines were subsequently removed from around the orchids by ForestrySA.

Other possible threats from associated forestry practices include (Quarmby 2007, pers. comm.):

- pine plantations altering hydrology of wet seepage areas where orchids occur;
- dense canopy of pine plantations limiting flowering of the orchids;
- use of fertilizers impacting through water runoff.

The Peters Creek population has been grazed by cattle for at least the last 30 years (Bates 2007, pers. comm.), significantly altering the understorey vegetation, causing soil erosion, and increasing weed incursion (Quarmby 2007, pers. comm.). Although stock grazing is no longer permitted in the Knott Hill plantation site, grazing by rabbits, hares or wallabies may present a management issue in future (DEH 2008; ForestrySA 2008).

Weed invasion is a potential threat to the species and its habitat. Blackberry (*Rubus* spp.), Gorse (*Ulex europaeus*) and Monadenia (*Disa bracteata*) occur at all sites and are likely to proliferate unless control measures are undertaken. These weeds have degraded all sites, and are suspected to have contributed to the decline of the Peters Creek population through competition for light, space, moisture, and nutrients. The Peters Creek site is also infested with pastoral weeds such as Yorkshire Fog (*Holcus lanatus*) due to cattle grazing (Quarmby 2007, pers. comm.).

Considering the swamp habitat required by this species, climate change is also a potential threat (DEH 2008; ForestrySA 2008).

9. Public Consultation

The nomination used in this assessment was made available for public exhibition and comment for 30 business days. No public comments were received.

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 Dark-tipped Sun-orchid is known from *Eucalyptus viminalis* / *Eucalyptus obliqua* open swampy woodland with a dense understorey of tea-tree, sedges, rushes and ferns. The potential habitat for this species on the Fleurieu Peninsula has been reduced and fragmented through vegetation clearance over the last 50 to 100 years. The three known sites occur within very small isolated remnants that are surrounded by cleared land, pine plantations, and vineyards.

The species was first recognised as a distinct species in the 1960s when it was commonly found in the Kuitpo Forest. The population size has been steadily declining until 2005, when felling of pines allowed some regeneration (Bates 2007, pers. comm.). Since then, most of the area where the species was found has been cleared and planted with pines, and the population size is known to be 129 mature flowering plants after a survey in 2007 at Knott Hill. It is

estimated that if the ForestrySA block of 3 ha was not replanted with pines, the Dark-tipped Sun-orchid could increase in numbers to several thousand in five years (Bates 2007, pers. comm.).

In the 1980s, the Peters Creek site contained a population of more than 100 plants, but it is likely that the species no longer survives at this site, due to cattle grazing of the understorey. Although this species prefers an open understorey, possibly including recently disturbed sites, and mature plants are likely to have the ability to remain dormant for several consecutive years, it is unlikely that the plants would survive being grazed over many years.

Given that the species was found to be common at the Knott Hill site in the 1960s, but now has a population size of only 129 plants, and that, at the Peters Creek site, the species was known to have a population size of more than 100 plants in the 1980s, but appears to no longer exist at this site, the Committee considers that the species is suspected to have undergone a reduction in numbers.

Although the Committee considers that the species is suspected to have undergone a reduction in numbers, there are no historical data on population numbers, hence there are insufficient data available to judge whether the reduction has been very severe, severe or substantial. Therefore, the species has not been demonstrated to have 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 Dark-tipped Sun-orchid has an extent of occurrence of approximately 1 km² and an area of occupancy of approximately 0.01 km². The species' geographic distribution is likely to have declined over the last 50 to 100 years due to vegetation clearance, and the area, extent and quality of suitable habitat is reduced and degraded.

The Dark-tipped Sun-orchid is a strongly self-pollinating species that only reproduces from seed. It prefers an open understorey, possibly including recently disturbed sites. A survey in October 2007 found that although the species occurs at the Knott Hill site, with a population of 129 mature flowering plants, it appears that it no longer survives at the Peters Creek site, as it has not been seen there since 1988.

With the extent of occurrence of this species estimated to be 1 km², and its area of occupancy estimated to be 0.01 km², and given the fragmented and restricted nature of the swampy woodland habitat, the Committee judges the geographic distribution to be very restricted.

The Committee judges that the species has a very restricted geographic distribution as a result of past forestry practices. The Committee also considers that the geographic distribution is precarious for the survival of the species due to continuing threats of vegetation clearance and habitat loss from forestry practices, grazing and weed invasion. 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**

The Dark-tipped Sun-orchid was known to be common in the 1960s. Since then, the number of plants has declined due to vegetation clearance for pine plantations, grazing and weed invasion. A survey in October 2007 found the total number of Dark-tipped Sun-orchids to be 129 mature flowering individuals, all occurring at Knott Hill. Although mitigation measures have been implemented, it is likely that the numbers will continue to decline due to potential threats of aerial herbicide spraying, fertilizer runoff, pine plantation, grazing by rabbits and hares, and weed invasion. The species is thought to be extinct at the Peters Creek site where grazing occurs. The species' geographic distribution is very restricted and is precarious for its survival.

The total number of mature flowering individuals of the Dark-tipped Sun-orchid is 129 plants. Given its very restricted geographic distribution, and the potential threats of forestry practices and weed invasion affecting the two populations at Knott Hill, the Committee judges this number to be very low.

The Committee judges that the estimated total number of mature flowering individuals of the species is very low, that the number is likely to continue to decline and its geographic distribution is precarious for its survival. Therefore, the species has been demonstrated to have met the relevant elements of Criterion 3 to make it **eligible** for listing as **critically endangered**.

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

The total number of mature flowering individuals of the Dark-tipped Sun-orchid is 129 plants. Given its very restricted geographic distribution, and the potential threats of forestry practices and weed invasion affecting the two populations at Knott Hill, the Committee judges this number to be very low. Therefore, the species has been demonstrated to have met the relevant element of Criterion 4 to make it **eligible** for listing as **endangered**.

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 not been demonstrated to have met the required elements of Criterion 5, it is **not eligible** for listing in any category under this criterion.

11. CONCLUSION

Listing category

Thelymitra cyanapicata (Dark-tipped 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 critically endangered category of the list.

The Committee accepts that the species' geographic distribution of 1 km² is very restricted and is precarious for its survival due to potential threats of grazing by rabbits and hares, weed invasion, and forestry practices such as aerial herbicide spraying, and that the estimated total number of 129 mature flowering individuals is very low and is likely to decline. Therefore, the species has been demonstrated to have met sufficient elements of Criteria 2 and 3 to make it **eligible** for listing as **critically endangered**.

The Committee accepts that the species' estimated total number of 129 is very low. Therefore, the species has been demonstrated to have met sufficient elements of Criterion 4 to make it **eligible** for listing as **endangered**.

The highest category for which the species is eligible to be listed is **critically endangered**.

Recovery Plan

The species is restricted and recovery actions can be adequately addressed and implemented through Conservation Advice, therefore the Committee considers that there should not be a recovery plan for this species.

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 cyanapicata* (Dark-tipped 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

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<<http://www.flora.sa.gov.au/census.html>>