

THREATENED SPECIES SCIENTIFIC COMMITTEE

Established under the *Environment Protection and Biodiversity Conservation Act 1999*

The Minister's delegate approved this Conservation Advice on 16/12/2016.

Conservation Advice

Thelymitra dedmaniarum

cinnamon sun orchid

Conservation Status

Thelymitra dedmaniarum (cinnamon sun orchid) is listed as Endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act) effective from 16 July 2000. The species was eligible for listing under the EPBC Act as on 16 July 2000, it was listed as Endangered under Schedule 1 of the preceding Act, the *Endangered Species Protection Act 1992* (Cwlth).

The cinnamon sun orchid is listed as Critically Endangered under the *Wildlife Conservation Act 1950* in Western Australia.

The main factors that make the species eligible for listing in the Endangered category are its small population size with a very low total number of mature individuals, and restricted area of occupancy.

Description

The cinnamon sun orchid grows to 80 cm high (Spooner 2007) and has a broad-ovate acute leaf to 15 cm long, with up to 10 or more golden-bronze flowers to 5 cm across (Hopper et al., 1990, cited in Phillimore et al., 1999). The flowers have a distinctive, strong cinnamon scent and this has resulted in the species being given the common name of the cinnamon sun orchid (Hopper et al., 1990, cited in Phillimore et al., 1999).

Species of *Thelymitra* are known as sun orchids because their flowers remain closed at night or during cool, cloudy weather and open only on warm sunny days (Brown et al., 2008, cited in DEC 2012).

Distribution

The cinnamon sun orchid is endemic to southwestern Western Australia where it is known from three populations northeast of Perth (two northwest of Gidgegannup and one northwest of Gingin). The three populations together comprise around 40 flowering plants estimated in a survey in 2012 (DEC 2012).

The cinnamon sun orchid grows in *Eucalyptus wandoo* (wandoo) and *E. accedens* (powderbark wandoo) woodlands on red-brown sandy-loam soil associated with dolerite and granite outcrops (Jeanes 2006). Associated species include *Acacia pulchella* (prickly moses), *A. saligna* (golden-wreath wattle), *Calothamnus quadrifidus* (one-sided bottlebrush), *Melaleuca radula* (graceful honey-myrtle) and *Hakea lissocarpha* (honey-bush) (DEC 2012).

The population northwest of Gingin is in open low woodland of *Eucalyptus marginata* (Jarrah) and *Corymbia calophylla* (Marri) with an understorey of *Hakea trifurcata* (two-leaf hakea), *Bossiaea aquifolium* (water bush) and *Hibbertia hypericoides* (yellow buttercups) (Hoskins 2009, cited in DEC 2012).

The species occurs on a range of land tenures, including public recreation and nature reserves, road reserves, and privately owned properties (DEC 2012).

Relevant Biology/Ecology

As with other Western Australian orchids, seed germination and seedling growth of the cinnamon sun orchid is reliant upon an interaction with symbiotic soil fungi, an association that continues into adulthood (DEC 2012).

The cinnamon sun orchid flowers from late October through to December or January (Jeanes 2006, Spooner 2007). The large, freely opening flowers and spasmodic capsule production allow for insect pollination (Jeanes 2006). A pollinator of the cinnamon sun orchid is a beetle (*Diaphanops westermanni*) from the family Chrysomelidae, though it is not likely to be the main pollinator (DEC 2012).

Threats

The main threats to the species are weed invasion, grazing and trampling, road, track and firebreak maintenance, changed fire regimes, motorbikes and off road vehicles, illegal picking and whole plant collection, poor recruitment and future mining operations (DEC 2012).

Table 1 – Threats impacting the cinnamon sun orchid in approximate order of severity of risk, based on available evidence.

| Threat factor | Threat type and status | Evidence base |
|--|------------------------|--|
| Invasive species | | |
| Weed invasion | known current | Weeds are a threat to all populations. <i>Watsonia</i> (<i>Watsonia</i> sp.) and cape tulip (<i>Moraea</i> sp.) are a threat to one of the populations northwest of Gidgegannup, and introduced grasses are a threat to most of the other areas, particularly on road reserves. Weeds suppress early plant growth by competing for soil moisture, nutrients and light. They also increase the likelihood of fire due to the easy ignition of high fuel loads, which are produced annually by many grass weed species (DEC 2012). |
| Digging, trampling and grazing by feral pigs and rabbits | current | Feral pigs (<i>Sus scrofa</i>) dig through large areas of soil in search of food, damaging plants and providing habitat for weeds (DEC 2012). Grazing impacts occur from both feral pigs and rabbits (<i>Oryctolagus cuniculus</i>) (DEC 2012). |

| Habitat loss, disturbance and fragmentation | | |
|---|-----------|---|
| Road, track and firebreak maintenance | current | Activities including grading, chemical spraying, construction of drainage channels and the mowing of roadside vegetation are a threat to the two populations northwest of Gidgegannup. Several of these activities can also encourage weed invasion in the areas where the species occurs (DEC 2012). |
| Recreational vehicle disturbance | current | Two locations northwest of Gidgegannup where the species occurs are subject to disturbance from recreational motorbike and off-road vehicles. These activities may cause dissection of the habitat and eventual erosion of the edges of vegetation occurring where tracks are created. There is an increased risk of damage to the species through trampling and through the spread of disease (DEC 2012). |
| Illegal picking, plant collection and trampling | current | Illegal picking, plant collection and trampling is a threat in two of the locations for populations northwest of Gidgegannup which are in areas used by the general public (DEC 2012). |
| Mining operations | potential | Mineral extraction leases cover the sites of the two populations northwest of Gidgegannup. Mining operations have the potential to severely impact habitat for the cinnamon sun orchid (DEC 2012). |
| Fire | | |
| Timing | potential | Inappropriate timing of fires may interfere with the reproductive phase of the orchid (flowering, pollination, seed growth and seed dispersal). Considering the restricted distribution and low numbers of the cinnamon sun orchid, populations could be seriously impacted if burnt during the species' active growing period between late April and early November. Fire may also facilitate weed invasion and affected areas should be followed up with appropriate weed control (DEC 2012). |

Conservation Actions

Conservation and Management priorities

Invasive species

- Control invasive weeds by the most appropriate technique – herbicide or hand weeding (DEC 2012). Ensure that the disturbance/overspray associated with these control methods are minimised.
- Revegetate only if shown to be necessary for the survival of the species with site-specific species to reduce or maintain low weed levels.
- Install cages and fencing where required, to prevent impacts on plants from digging, trampling and grazing by feral pigs and rabbits (DEC 2012).

- Control feral pigs through baiting or other methods (DEC 2012) in accordance with the 'Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs' (DEH 2005).
- Control rabbits through methods that are in accordance with the 'Threat abatement plan for competition and land degradation by rabbits' (DEWHA 2008).

Habitat loss, disturbance and modifications

- Protect known populations and associated habitat from agricultural intensification, infrastructure development and maintenance activities.
- Install DRF markers¹ on road verges of the populations northwest of Gidgegannup to reduce the risk of accidental damage during road maintenance.
- Install barriers such as bollards or fencing to sites northwest of Gidgegannup that are at risk from recreational vehicle impacts and collecting. These sites may further benefit from the installation of signs indicating the significance of the area, to prevent trampling (DEC 2012).
- Investigate the possibility of obtaining land containing populations of the cinnamon sun orchid, to be declared as reserves for conservation (DEC 2012).

Fire

- Develop and implement a fire management strategy in consultation with relevant authorities and land managers. The strategy is to exclude fire from the habitat of cinnamon sun orchid populations, particularly during the species' active growing period between late April and November, and provide guidance on appropriate fire frequency, intensity, seasonality, and control measures (DEC 2012).
- Following unplanned fires, implement broad scale control of watsonia weeds in the population northwest of Gidgegannup where the weed occurs (DEC 2012).
- Physical damage to the habitat and individuals of the threatened species must be avoided during and after fire operations.
- Fire management authorities and land management agencies should use suitable maps and install field markers to avoid damage to the threatened species/EC.

Seed collection, propagation and other ex-situ recovery action

- To preserve genetic diversity, additional seed of the cinnamon sun orchid is to be collected and stored along with samples of the symbiotic fungus in appropriate institutions including Curtin University and Kings Park and Botanic Garden. Collections should aim to sample and preserve the maximum range of genetic diversity possible, and be determined by an appropriate molecular technique such as genetic fingerprinting (DEC 2012).
- Ex-situ propagation should be undertaken to develop seed production capabilities as well as prepare approaches for translocation of the species for reinforcement plantings and introduction to secure sites.

¹ DRF markers are used in Western Australia and are two standardised yellow markers at either end of a site, which are bent to face towards each other, indicating that DRF (DRF = Declared Rare Flora) plants may occur anywhere between the markers, from the road's running surface to the fence. They alert people working in the vicinity to the presence of DRF, and the need to avoid work that may damage vegetation in the area (DEC 2013).

Stakeholder Engagement

- Liaise with and support land managers in commencing, continuing and/or extending treatment of weeds in populations, including watsonia in the population northwest of Gidgegannup (DEC 2012).
- Liaise with land managers to ensure that populations of the cinnamon sun orchid are not accidentally damaged or destroyed (DEC 2012).
- Undertake indigenous consultation to determine if there are any issues or interests in areas that are habitat for the cinnamon sun orchid (DEC 2012).
- Encourage volunteers from the local community, Landcare groups, the Western Australian Native Orchid Study and Conservation Group, wildflower societies and naturalists clubs to participate in surveys for the cinnamon sun orchid (DEC 2012).
- Promote public awareness of the importance of protecting the cinnamon sun orchid, including through mechanisms such as print and electronic media (eg. poster and current information sheet), and distribute this information to local landowners and shires (DEC 2012).

Survey and Monitoring priorities

- Monitor the progress of recovery, including the effectiveness of management actions and the need to adapt them if necessary. Factors to be monitored include: grazing impacts from feral pigs and rabbits, weed invasion, habitat degradation, population stability (expansion or decline), pollinator activity, seed production and recruitment (DEC 2012).
- Survey areas of potential habitat for the presence of the cinnamon sun orchid during its flowering period. Should additional populations be located, determine and map the habitat critical to the species' survival (DEC 2012).
- Undertake mapping of invasive weeds within reserves that contain populations of the cinnamon sun orchid (DEC 2012).
- Monitor and report on the effects of weed control on the cinnamon sun orchid and associated native plant species (DEC 2012).

Information and research priorities

- Improve understanding of the biology and ecology of the cinnamon sun orchid to provide a clearer basis for its management in the wild. This includes researching the fungal symbiont associated with the cinnamon sun orchid and its distribution in the wild, seed viability and conditions necessary for germination, the species' response to disturbance such as fire, the longevity of plants and time taken to reach maturity, and the species' pollination biology, identification of pollinators and their habitat requirements (DEC 2012) and translocation technology.

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