

Conservation Advice

Thelymitra adorata

Wyong sun orchid

Taxonomy

Conventionally accepted as *Thelymitra adorata* Jeanes

Conservation status

Critically Endangered: Criterion 2 A1, A2 a, b (i-v), Criterion 3 A2 a, b (i-v) and Criterion 4 (a)

Species can be listed as threatened under state and territory legislation. For information on the listing status of this species under relevant state or territory legislation, see

<http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl>

Reason for conservation assessment by the Threatened Species Scientific Committee

This advice follows assessment of information provided by a public nomination to list *Thelymitra adorata* (Wyong sun orchid).

Description

The Wyong sun orchid is a hairless terrestrial herb, which dies back annually to a tuberous rootstock. The Wyong sun orchid produces a single leaf around May which dies off in late November. The leaf, 10-40 cm long and 5-20 mm wide, is fleshy and ribbed on the back and is green in colour with a purple base. The flowering stem, 20-60 cm tall and 2-5 mm in diameter, usually emerges in September. The flowers are fragrant and are 2-13 in number. Individual flowers are 15-27 mm across and are borne on slender stalks 1-14 mm long. Flowers are pale to dark blue-purple in colour and open in warm, sunny weather (NSW OEH, 2012; NSW Scientific Committee, 2008).

Distribution

The Wyong sun orchid is known from a number of localised occurrences within the Wyong Local Government Area on the NSW Central Coast. The species occurs within the Hunter-Central Rivers Catchment Management Authority in the Sydney Basin Bioregion (NSW Scientific Committee, 2008; Thackway and Cresswell, 1995). The species' extent of occurrence and area of occupancy are both estimated to be less than 10 km². During searches in 2013, less than 50 flowering plants were located from five locations on both private and public land (Branwhite, pers. comm., 2013).

Cultural Significance

Not known.

Relevant Biology/Ecology

The Wyong sun orchid occurs in areas 10-40 m above sea level, in woodland with grassy understorey, or occasionally derived grassland, in well-drained clay loam or shale derived soils. The vegetation type in which the majority of populations occur has been described as Dooralong Spotted Gum - Ironbark Forest. The typical composition of this habitat is an overstorey of *Corymbia maculata* and *Eucalyptus paniculata*, with an open to dense shrub layer of *Melaleuca nodosa* over a diverse grass/herb ground layer. This type of habitat is highly fragmented within Wyong, and less than 2200 ha remains within the shire. The Wyong sun orchid may also be found within two other habitat types - the Alluvial Redgum Foothills Forest and Alluvial Floodplain Shrub Swamp Forest – where these habitat types adjoin the habitat in which the species is usually recorded (Bell, 2002).

Jones (2006) asserts that the Wyong sun orchid is self-pollinating. Stems usually occur in clumps of three to six. The species produces flowers in September and October (Jones, 2006) although not all plants flower every year. Fruits are developed in October and November. The longevity of individual plants and rate of tuber exhaustion are unknown. Fire response is also unknown for this species; however the tubers are likely to survive low-intensity fires (NSW Scientific Committee, 2008).

Threats

There are a number of ongoing threats currently impacting upon the Wyong sun orchid.

Weed invasion is a threat to orchids in the Wyong Shire. Weeds compete with orchids for light, moisture and nutrients (Waite and Farrell, 1998; Willems and Melsner, 1998). In the Wyong shire, competition from lantana (*Lantana camara*), bitou bush (*Chrysanthemoides monilifera*), whisky grass (*Andropogon virginicus*) and kikuyu (*Pennisetum clandestinum*) pose a threat to native orchids (Bell et al., 2005). Two localities in which the species occurs are heavily infested with whisky grass (Branwhite, pers. comm., 2013).

The area covered by native vegetation within the distributional range of this species has declined substantially in recent years (Weston, pers. comm., 2014). The clearance of habitat for urban and industrial development, and associated fragmentation of habitat, is a threat to the Wyong sun orchid (Branwhite, pers. comm., 2013). Land clearance can have an impact both through the direct loss of populations, and through indirect impacts from clearance at adjacent areas such as a reduction in habitat for pollinating agents, genetic bottlenecks, edge effects and alteration to moisture regimes and nutrient levels (Cramer and Hobbs, 2002; King and Buckney, 2002).

Rabbits are a threat to the species due to grazing on the flowering plants as well as digging up tubers (Wyong Shire Council, 2000). Cattle, horses and macropods may eat the flowering plants of orchids. While grazing of flowering plants does not usually destroy the plant, it can prevent the plant from setting seed that season (Metcalf, 1995).

Over-collection of tubers by both botanists for herbarium specimens and by gardeners for their personal collections is a potential threat to native orchids in the Wyong shire. Additional threats to the species include: physical disturbance caused by the creation of tracks within bushland areas (which allows for the encroachment of weeds and the erosion and disturbance of soil); physical disturbance caused by motorbikes (damaging plants on the side of tracks); rubbish dumping in the area in which the species occurs (Smith, pers. comm., 2014); maintenance activities such as spraying herbicides or mowing at an inappropriate time of year (Branwhite, pers. comm., 2013). The alteration to natural flows of watercourses, road verge maintenance (NSW Scientific Committee, 2008) and inappropriate fire regimes also pose a threat to native orchids (Duncan, 2012). However, for this species the appropriate fire regime is not yet known.

How judged by the Committee in relation to the EPBC Act Criteria and Regulations

Criterion 1: Reduction in numbers (based on any of A1 – A4)

- A1. An observed, estimated, inferred or suspected population very severe $\geq 90\%$, severe $\geq 70\%$ substantial $\geq 50\%$ size reduction over the last 10 years or three generations, whichever is the longer, where the causes of the reduction are clearly reversible AND understood AND ceased, based on (and specifying) any of the following:
- (a) direct observation
 - (b) an index of abundance appropriate to the taxon
 - (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
 - (d) actual or potential levels of exploitation
 - (e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.
- A2. An observed, estimated, inferred or suspected population very severe $\geq 80\%$, severe $\geq 50\%$ substantial $\geq 30\%$ size reduction over the last 10 years or three generations, whichever is the

longer, where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.

- A3. A population size reduction very severe $\geq 80\%$, severe $\geq 50\%$ substantial $\geq 30\%$, projected or suspected to be met within the next 10 years or three generations, whichever is the longer (up to a maximum of 100 years), based on (and specifying) any of (b) to (e) under A1.
- A4. An observed, estimated, inferred, projected or suspected population size reduction very severe $\geq 80\%$, severe $\geq 50\%$ substantial $\geq 30\%$ over any 10 year or three generation period, whichever is longer (up to a maximum of 100 years in the future), where the time period must include both the past and the future, and where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.

Evidence

Bell (2002) estimates that, following human settlement in the area, approximately 53% of the vegetation type in which this species typically occurs (Dooralong Spotted Gum – Ironbark Forest) has been lost. Further loss of this vegetation type is likely to have occurred since 2002 (Branwhite, pers. comm., 2013). The two alternative vegetation types in which this species may occur have also undergone significant declines. In total, losses of suitable habitat in areas in which this species is known to occur, or may occur, range from approximately 53% to 86% since human settlement (NSW Scientific Committee, 2008).

Bell et al. (2005) reported a decline in the number of individual plants of the species for at least two (total 16 plants lost) and possibly up to five (a further 43 plants) of the previously known six localities between 1998 and September 2003. Of the 213 plants counted, Bell et al. infer a decline of up to approximately 20% over this time period (Branwhite, pers. comm., 2014).

As there is known to have been as many as 213 individuals in the past, and in 2013 less than 50 individuals were sighted across all known localities (Branwhite, pers. comm., 2013) the species has been demonstrated to have undergone a past decline in numbers. As numerous ongoing threats are impacting upon the species (outlined in the threats section above) the species is likely to undergo a future reduction in numbers.

Based on the estimations provided by Bell et al. (2005), Branwhite (2014) and Smith (2014), it is apparent that there has been a decline in the population of some magnitude. However, the data are insufficient at this stage to estimate the magnitude of this decline. Therefore, there is insufficient information to determine the eligibility of the taxon for listing, in any category under this criterion.

Criterion 2: Geographic distribution (based on either of A1 or A2)

- A1. Extent of occurrence estimated to be very restricted $< 100 \text{ km}^2$, restricted $< 5000 \text{ km}^2$ or limited $< 20\,000 \text{ km}^2$
- A2. Area of occupancy estimated to be very restricted $< 10 \text{ km}^2$, restricted $< 500 \text{ km}^2$ or limited $< 2000 \text{ km}^2$

AND

Geographic distribution is precarious for the survival of the species,
(based on at least two of a–c)

- a. Severely fragmented or known to exist at a limited location.
- b. Continuing decline, observed, inferred or projected, in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) area, extent and/or quality of habitat
 - (iv) number of locations or subpopulations
 - (v) number of mature individuals.

- c. Extreme fluctuations in any of the following:
- (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) number of locations or subpopulations
 - (iv) number of mature individuals

Evidence

The species' extent of occurrence and its area of occupancy are both <10 km² (NSW Scientific Committee, 2008; Branwhite, pers. comm., 2013). This extent of occurrence and area of occupancy are below the threshold for a 'very restricted' distribution.

The species is only known from a small number of localities within the Wyong Local Government Area on the NSW Central Coast. As such, the species is known to exist in a limited location. A decline in the number of mature individuals and populations, the area of occupancy, extent of occurrence and quality of habitat is projected due to the ongoing threats outlined in the threats section above.

Given the above, the Committee considers the species' geographic distribution to be very restricted and precarious for the species' survival.

2 A1, A2 and a, b(i-v): **eligible for listing as critically endangered.**

Criterion 3: The estimated total number of mature individuals is very low <250, low <2500 or limited <10 000; **and** either of (A) or (B) is true

(A1) evidence suggests that the number will continue to decline at a very high (25% in 3 years or 1 generation (up to 100 years), whichever is longer), high (20% in 5 years or 2 generations (up to 100 years), whichever is longer) or substantial (10% in 10 years or 3 generations years), whichever is longer (up to 100) rate; or

(A2) the number is likely to continue to decline and its geographic distribution is precarious for its survival (based on at least two of a – c):

- a. Severely fragmented or known to exist at a limited location.
- b. Continuing decline, observed, inferred or projected, in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) area, extent and/or quality of habitat
 - (iv) number of locations or subpopulations
 - (v) number of mature individuals.
- c. Extreme fluctuations in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) number of locations or subpopulations
 - (iv) number of mature individuals

Evidence

Smith, pers. comm., 2014 notes that over the last two flowering seasons between 50-70 mature adult plants were sighted. Branwhite, pers. comm., 2013 notes that less than 50 flowering plants were located on both private and public land during his searches in 2013 across all known localities. Given the above, the Committee considers the number of mature individuals to be very low.

The species' geographic distribution is precarious for its survival given that it occurs in a limited location and is being impacted upon by numerous ongoing threats (outlined in the threats section above). Continuing decline in the number of mature individuals and populations, the area of occupancy, extent of occurrence and quality of habitat is projected.

3 A2, a, b (i-v): **eligible for listing as critically endangered.**

Criterion 4: Estimated total number of mature individuals:

- (a) Extremely low < 50
- (b) Very low < 250
- (c) Low < 1000

Evidence

Smith, pers. comm., 2014 notes that over the last two flowering seasons between 50-70 mature adult plants were sighted. Branwhite, pers. comm., 2013 notes that less than 50 flowering plants were located on both private and public land during his searches in 2013 across all known localities. As less than 50 flowering plants were observed during field inspections in 2013 (Branwhite, pers. comm., 2013) the Committee considers the number of mature individuals to be extremely low.

4(a): **eligible for listing as critically endangered.**

Criterion 5: Probability of extinction in the wild based on quantitative analysis is at least:

- (a) 50% in the immediate future, 10 years or three generations (whichever is longer); or
- (b) 20% in the near future, 20 year or five generations (whichever is longer); or
- (c) 10% in the medium-term future, within 100 years.

Evidence

Not applicable: Population viability analysis has not been undertaken.

Public Consultation

Notice of the proposed amendment was made available for public comment for 40 business days between 3 December 2013 and 31 January 2014. Any comments received that are relevant to the survival of the species have been considered by the Committee.

Recovery Plan

There should not be a recovery plan for the Wyong sun orchid as the approved conservation advice for the species provides sufficient direction to implement priority actions and mitigate against key threats. In addition, a conservation project for this species has been developed by the NSW Office of Environment and Heritage under its *Saving our Species* program. As existing mechanisms are considered adequate to manage the identified issues, preparing a recovery plan would be duplicative.

Recovery and Impact avoidance guidance

Primary Conservation Objectives

1. Maintain and enhance the species' habitat
2. Increase the number and size of wild populations
3. Raise awareness of the species, and the legislative requirements surrounding the harm of threatened species, within the local community
4. Effectively administer the recovery effort.

Important habitat to this species includes Dooralong Spotted Gum - Ironbark Forest (as described under the 'Relevant Biology/Ecology' section above). This habitat is highly fragmented within Wyong Shire, and less than 2200 ha remain within the shire (Bell, 2002).

Information required and research priorities

Research priorities that would inform future priority actions include:

1. More precisely assess population size, distribution, ecological requirements and the relative impacts of threatening processes.
2. Undertake survey work in suitable habitat and potential habitat to locate any additional populations/occurrences/remnants. Surveys should involve a specialist ground orchid consultant, to assist in finding and identifying the species.
3. Design and implement an ongoing monitoring program to track the species' recovery.
4. Undertake seed germination and/or vegetative propagation trials to determine the requirements for successful establishment, including mycorrhizal association trials and cultivate the species in botanic gardens.
5. Identify optimal fire regimes for regeneration (vegetative regrowth and/or seed germination), and response to other prevailing fire regimes.
6. Investigate the potential and efficacy of DNA-based or other approaches for the identification of individual plants and/or populations to provide a means for detecting and prosecuting illegal collection from the wild.

Management actions required

1. Monitor the progress of recovery, including the effectiveness of management actions and the need to adapt them if necessary.
2. Undertake appropriate seed and mycorrhizal fungi collection and storage (collect seed for NSW Seedbank).
3. Where necessary and appropriate, restrict access to important sites by installing gates, fencing and signs.
4. Investigate formal conservation arrangements, management agreements and covenants on private land with known occurrence.
5. Undertake rabbit control in the area. In addition, place cages around plants to prevent grazing by rabbits.
6. Undertake appropriate maintenance of grassland / open shrubland habitat in which the species may occur e.g. through not mowing at inappropriate times of year.
7. Identify and remove new weeds in the local area that could become a threat to the species, using appropriate methods.
8. Develop and implement a management plan for the control of weeds currently occurring in the region including lantana (*Lantana camara*), bitou bush (*Chrysanthemoides monilifera*), whisky grass (*Andropogon virginicus*) and kikuyu (*Pennisetum clandestinum*).
9. Ensure chemicals or other mechanisms used to eradicate weeds do not have a significant adverse impact on the species. Hand weeding is recommended in preference to the use of herbicides near populations of the species.
10. If livestock grazing occurs in the area, ensure land owners/managers use an appropriate management regime and density that does not detrimentally affect this species.
11. Develop and implement a suitable fire management strategy for the habitat of the species. Where appropriate provide maps of known occurrences to local and state Rural Fire Services and seek inclusion of mitigative measures in bush fire risk management plan/s, risk register and/or operation maps.
12. Engage with private landholders and land managers responsible for the land on which populations occur and encourage these key stakeholders to contribute to the implementation of conservation management actions.

The Minister approved this conservation advice on 30 June 2014 and included this species in the critically endangered category, effective from 19 July 2014

13. Provide advice to developers, consultants and approval authorities about the existence of the species and its significance.
14. Investigate options for linking, enhancing or establishing additional populations.
15. Implement national translocation protocols (Vallee et al., 2004) if establishing additional populations is considered necessary and feasible.

This list does not necessarily encompass all actions that may be of benefit to the Wyong sun orchid, but highlights those that are considered to be of highest priority at the time of preparing the Approved Conservation Advice.

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 adorata

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

Threatened Species Scientific Committee
04/03/2014

References cited in the advice

- Bell SAJ (2002). The natural vegetation of the Wyong Local Government Area, Central Coast, New South Wales. Parts 1 and 2. Report to Wyong Shire Council. East Coast Flora Survey, Kotara Fair, NSW. In 'Wyong Conservation Strategy Technical Reports' (2003). Wyong Shire Council.
- Bell S, Branwhite B and Driscoll C (2005). *Thelymitra adorata* Jeanes ms (Orchidaceae): population size and habitat of a highly restricted terrestrial orchid from the Central Coast of New South Wales. *The Orchadian* 15: 6-10
- Branwhite B (2013). Personal communication by email, October 2013. Wyong Terrestrial Orchid Researcher.
- Branwhite B (2014). Personal communication by email, 29 January 2014. Wyong Terrestrial Orchid Researcher.
- Cramer VA and Hobbs RJ (2002). Ecological consequences of altered hydrological regimes in fragmented ecosystems in southern Australia: impacts and possible management responses. *Austral Ecology* 27, 546–564.
- Duncan M (2012). Response of Orchids to Bushfire: Black Saturday Victoria 2009 – Natural values fire recovery program. Department of Sustainability and Environment, Heidelberg, Victoria.
- Jones DL (2006). A complete guide to native orchids in Australia including the island territories. Reed New Holland, Frenchs Forest NSW.
- King S and Buckney R (2002). Invasion of exotic plants in nutrient-enriched urban bushland. *Austral Ecology* 27: 573-583.
- Metcalf (1995). Orchids of the Walcha/Nundle and Styx River Management Areas', Walcha/Nundle and Styx River Management Areas EIS Supporting Document No. 2A, State Forests.
- NSW Scientific Committee (2008) *Thelymitra adorata* - Critically Endangered species determination - final.
Viewed 23 September 2013
Available on the Internet at:
<http://www.environment.nsw.gov.au>
- NSW Office of Environment and Heritage (NSW OEH). (2012). Wyong sun orchid – Profile.
Viewed 23 September 2013
Available on the Internet at:
<http://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=20099>
- Smith B (2014). Personal communication by email, 30 January 2014, Conservation Officer, Australasian Native Orchid Society Inc. Central Coast.
- Thackway R, Cresswell ID (1995). An interim biogeographic regionalisation for Australia (Version 4.0). Australian Nature Conservation Agency, Canberra.
- Vallee L, Hogbin T, Monks L, Makinson B, Matthes M and Rossetto M (2004) Guidelines for the Translocation of Threatened Plants in Australia. Second Edition, Australian Network for Plant Conservation, Canberra.
- Waite S and Farrell L (1998). Population biology of the rare military orchid (*Orchis militaris*) at an established site in Suffolk, England. *Botanical Journal of the Linnean Society* 126: 109–21.
- Weston P (2014). Personal communication by email, 31 January 2014, Senior Principle Research Scientist, The Royal Botanic Gardens and Domain Trust.

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Willems JH and Melser C (1998). Population dynamics and life-history of *Coeloglossum viride* (L.) Hartm.: an endangered orchid species in The Netherlands. Bot J Linn Soc 126:86-96.

Wyong Shire Council (2000). Interim Survey Guidelines for Ground Orchids which are listed on the Threatened Species Conservation Act, 1995 in Wyong Shire. New South Wales.