

## Conservation Advice

### *Corunastylis insignis*

#### Wyong midge orchid 1

#### Taxonomy

Conventionally accepted as *Corunastylis insignis* D.L.Jones

#### Conservation status

Critically Endangered: Criterion 2 A1 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 *Corunastylis insignis* (Wyong midge orchid 1).

#### Description

The Wyong midge orchid 1 is a perennial orchid. The species has a single leaf which is cylindrical in shape and encloses the flowering stem for most of its length. The leaf, 6-5 cm long and 0.15 cm wide, is dark green in colour with a reddish base. The flowering stem is 9-18 cm tall, and bears 5-12 flowers in a moderately dense spike which is 15-25 mm long. Flowers are approximately 5 mm in diameter and dark purple in colour (NSW OEH, 2001; NSW Scientific Committee, 2001).

#### Distribution

The Wyong midge orchid 1 occurs within the Wyong Local Government Area on the NSW Central Coast. The species occurs within the Sydney Basin Bioregion and the Hunter-Central Rivers Catchment Management Authority. The species has been recorded from Chain Valley Bay (found at two localities), Charmhaven (found at three localities) and Lakehaven (no flowering plants recorded in the past 10 years). Field inspections throughout 2013 found less than twenty plants across all known localities (Branwhite, pers. comm., 2013).

In December 2013, the primary site at Charmhaven was impacted by construction activities (Branwhite, pers. comm., 2014; Mitford, pers. comm., 2014; Smith, pers. comm., 2014). Several acts of vandalism, such as destruction of fences, also occurred at this site (Payne, pers. comm., 2014). However, the extent of damage to this population can not be ascertained until plants flower in the future (Branwhite, pers. comm., 2014; Mitford, pers. comm., Payne, pers. comm., 2014; Smith, pers. comm., 2014).

#### Cultural Significance

Not known.

#### Relevant Biology/Ecology

The Wyong midge orchid 1 occurs in patches of *Themeda australis* (kangaroo grass) amongst shrubs and sedges in heathland and forest. At Chain Valley Bay, the vegetation associated with the species has been described as 'Dry sclerophyll woodland dominated by *Eucalyptus haemastoma* (scribbly gum), *Corymbia gummifera* (red bloodwood), *Angophora costata* (smooth-barked apple) and *Allocasuarina littoralis* (black she-oak)' (NSW OEH, 2001). The flowering period of the species is from August to November (Jones, 2006).

The species' lifecycle is believed to be similar to other *Corunastylis* species (see Frawley, 2010) in that it is believed to be a seasonal perennial, which shoots from a dormant underground tuber following winter rain. In the absence of rain during the appropriate season, the species remains dormant. Flowering occurs approximately six weeks after the initialising rain event, usually in September. After setting seed, the aerial portion of the plant withers and the tubers remain dormant until the next substantial winter rainfall. The species is likely to be pollinated by small flies (midges), usually in the Chloropidae family. Seed dispersal is by wind and water (Branwhite, pers. comm., 2013).

## Threats

There are a number of ongoing threats currently impacting upon the Wyong midge orchid 1.

Weed invasion is a threat to orchids in the Wyong Shire. Weeds compete with orchids for light, moisture and nutrients (Metcalf, 1995; Waite and Farrell, 1998; Willems and Melser, 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).

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 midge orchid 1 (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) (Branwhite, pers. comm., 2013); compaction of tubers and surrounding soil by the passage of vehicles over known sites; the possible exhumation or burial of tubers associated with earthworks (Gibson, pers. comm., 2014); and maintenance activities such as spraying herbicides or mowing at an inappropriate time of year (Branwhite, pers. comm., 2013). 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

The species' range prior to European settlement is unknown (Gibson, pers. comm., 2014). The area covered by native vegetation within the distributional range of this species has declined substantially in recent years and it is likely that this decline has also impacted upon the habitat of this species (Weston, pers. comm., 2014). Given the ongoing threats impacting upon the species (outlined in the threats section above), the species is suspected to have undergone a reduction in numbers, and is likely to undergo a future reduction in numbers.

However, there are insufficient data available to quantitatively determine the past or future rate of decline for the purposes of this criterion i.e. whether the reduction was / will be very severe, severe, substantial, or not substantial. A decline of at least 30% has not been demonstrated over the timeframe relevant to this criterion (i.e. 'over the last or next 10 years or three generations' or 'over any 10 year or three generation period, whichever is longer, where the time period includes both the past and the future').

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 area of occupancy are both estimated to be less than 40 km<sup>2</sup> (Branwhite, pers. comm., 2013). The Committee considers this to be a very restricted distribution.

The species' natural habitat has been highly fragmented through land clearance for development (Weston, pers. comm., 2014). The species' current distribution is highly fragmented and limited; it is only known to occur at a small number of localised sites within the Wyong Local Government Area. 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 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

Estimating the number of mature individuals is difficult for this species as not all mature plants appear to flower each year and plants in different populations flower at different times of year. (Gibson, pers. comm., 2014). Field inspections during 2013 found less than 20 plants across all known localities (Branwhite, pers. comm., 2013). This is below the threshold for a 'very low' number of mature individuals. In addition, following the 2013 field counts, the primary site at Charmhaven was impacted by illegal construction activities and vandalism. The extent of damage to this population can not be ascertained until individual plants emerge again (Branwhite, pers. comm., 2014; Mitford, pers. comm., 2014; Payne, pers. comm., 2014; Smith, pers. comm., 2014).

The species' geographic distribution is precarious for its survival. The species occurs in a limited location and continuing conversion of native vegetation to farmland and suburban development throughout its distribution makes it highly likely that this species is declining (Weston, pers. comm., 2014). As the species 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**

As noted under criterion 3, field inspections during 2013 found less than 20 plants across all known localities (Branwhite, pers. comm., 2013). Following these field counts, at the end of 2013, the primary site at Charmhaven was impacted by illegal construction activities and vandalism. The extent of damage to this population can not be ascertained until individual plants emerge again (Branwhite, pers. comm., 2014; Mitford, pers. comm., 2014; Payne, pers. comm., 2014; Smith, pers. comm., 2014). 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 midge orchid 1 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 populations

Given there are only four known populations of this species, and the total number of mature individuals is very low, the Committee considers all populations to be important.

## Important habitat for the survival of the species

The Wyong midge orchid 1 occurs in patches of *Themeda australis* (kangaroo grass) amongst shrubs and sedges in heathland and forest. Vegetation associated with this species has been described as dry sclerophyll woodland dominated by *Eucalyptus haemastoma* (scribbly gum), *Corymbia gummifera* (red bloodwood), *Angophora costata* (smooth-barked apple) and *Allocasuarina littoralis* (black she-oak).

## 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 occurrences.
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 Wyong midge orchid 1, 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 Wyong midge orchid 1. 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 Wyong midge orchid 1. 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.
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 midge orchid 1, 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:  
*Corunastylis insignis*
- (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

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

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