Notice of Preliminary Determination

The NSW Threatened Species Scientific Committee, established under the *Biodiversity Conservation Act 2016* (the Act), has made a Preliminary Determination to support a proposal to list the orchid *Pterostylis pedina* (D.L.Jones) Janes & Duretto as an ENDANGERED SPECIES in Part 2 of Schedule 1 of the Act. Listing of Endangered species is provided for by Part 4 of the Act.

This species is currently provisionally listed as an Endangered species.

How to make a submission

The NSW TSSC welcomes public involvement in the assessment process and places preliminary determinations on public exhibition on the NSW TSSC pages on the NSW Department of Climate Change, Energy, the Environment and Water (NSW DCCEEW) website. This public exhibition provides an opportunity for the public to comment on this preliminary determination as well as provide any additional information that is relevant to the assessment.

Postal submissions regarding this Preliminary Determination may be sent to:
Secretariat
NSW Threatened Species Scientific Committee
Locked Bag 5022
Parramatta NSW 2124.

Email submissions in Microsoft Word or PDF formats to:
scientific.committee@environment.nsw.gov.au

Submissions close 5 March 2026

What happens next?

After considering any submissions received during the public exhibition period the NSW TSSC will make a Final Determination and a notice will be placed on the NSW DCCEEW website to announce the outcome of the assessment. If the Final Determination is to support a listing, then it will be added to the Schedules of the Act when the Final Determination is published on the legislation website. www.legislation.nsw.gov.au.

Privacy information

The information you provide in your submission may be used by the NSW TSSC in the assessment to determine the conservation status and listing or delisting of threatened or extinct species, threatened populations and threatened or collapsed ecological communities or to assess key threatening processes.

The NSW TSSC may be asked to share information on assessments with NSW Government agencies, the Commonwealth Government and other State and Territory governments to collaborate on national threatened species assessments using a

common assessment method and to assist in the management of species and ecological communities.

If your submission contains information relevant to the assessment it may be provided to state and territory government agencies and scientific committees as part of this collaboration.

If you wish your identity and personal information in your submission to be treated as confidential you must:

- *request your name be treated as confidential*, and
- *not include any of your personal information in the main text of the submission or attachments so that it can be easily removed.*

Professor Angela Moles, FRSN
Chairperson
NSW Threatened Species Scientific Committee

Public Exhibition period: 05/12/2025 – 05/03/2026

Preliminary Determination

The NSW Threatened Species Scientific Committee, established under the *Biodiversity Conservation Act 2016* (the Act), has made a Preliminary Determination to support a proposal to list the orchid *Pterostylis pedina* (D.L.Jones) Janes & Duretto as an ENDANGERED SPECIES in Part 2 of Schedule 1 of the Act. Listing of Endangered species is provided for by Part 4 of the Act.

This species is currently provisionally listed as an Endangered species.

Summary of Conservation Assessment

Pterostylis pedina (D.L.Jones) Janes & Duretto was found to be Endangered in accordance with the following provisions in the *Biodiversity Conservation Regulation 2017*: Clause 4.3(b)(d)(e i,iii) and Clause 4.4(b)(e i,ii B) because: (1) it has a highly restricted geographic distribution with an estimated extent of occurrence of ~141 km^2, and an estimated area of occupancy of 28 km^2; (2) the estimated number of mature individuals is low (1,100–2,700) and 95% may occur in one subpopulation; (3) it occurs in three threat-defined locations; and (4) there is an inferred continuing decline in the number of mature individuals, and the area, extent, and quality of habitat attributed to soil disturbance and grazing by herbivores, and modification and disturbance from agriculture and infrastructure development.

The NSW Threatened Species Scientific Committee has found that:

1. *Pterostylis pedina* (D.L.Jones) Janes & Duretto (family Orchidaceae), commonly known as the Burrabogie rustyhood or plains rustyhood, is described in Jones (2021) as “Plants growing in clumps. Rosette leaves 8–12, oblong to elliptic, 10–43 x 5–12 mm, margins minutely ciliate. Flower stem 70–200 mm tall, 2 mm across, 1–6-flowered. Stem bracts 3–4. Flowers porrect to suberect, 30–35 x 9–11 mm, translucent white with green or light brown bands and markings. Dorsal sepal point filamentous, 8–12 mm long, porrect to upcurved. Lateral sepals wider than hood, shallowly concave, margins flat, densely hairy; free points filamentous, 14–25 mm long, divergent. Petals transparent, with large basal flanges that nearly meet, 12–14 x 4–4.5 mm. Labellum elliptic, 5–5.8 x 2.5 mm, thin-textured, green to light brown, tapered to base where constricted, apex flat; margins flat, with 16–22 spreading white bristles to 1.3 mm long; two prominent bristles c. 4 mm long projecting from near base; basal lobe thin, sloping backwards, glabrous or with few short bristles”. The basionym for this taxon is *Oligochaetochilus pedinus* (Jones 2009), however, *Pterostylis pedina* is the currently accepted name (CHAH 2018; PlantNET 2025).

2. *Pterostylis pedina* is currently known to occur in three subpopulations within the Murrumbidgee subregion of the Riverina bioregion in south-west New South Wales (NSW) (Commonwealth DCCEEW 2024): (1) On private property south-west of Oolambeyan National Park (NP); (2) in Yanga State Conservation Area (SCA),

approximately 119 km west of the Oolambeyan subpopulation; and (3) off Keri Keri Road, approximately 5 km east of the Yanga subpopulation.

3. There are an estimated 1,100–2,700 mature *Pterostylis pedina* individuals with ~59–95% occurring in the Yanga subpopulation. Surveyors of the Yanga subpopulation report an estimated total number of "perhaps a thousand or more" (Kosky 2021); a low confidence estimate of 1,000–2,000 individuals (D. Egan *in litt*. October 2024); and "thousands of plants spread over many hundreds of square metres" (M. and C. Beamish *in litt.* October 2024). Due to access restrictions, the current status of the Oolambeyan subpopulation is uncertain (D. Egan *in litt*. June 2022). Fewer than 100 flowering individuals were counted within an area of ~2 ha on the private property near Oolambeyan NP in spring 2003 (N. Reid, pers. comm. in D. Egan *in litt*. June 2022), but it was described as growing in "localised clumps that can consist of several hundred orchid plants distributed over several acres in one particular location and smaller numbers in other locations" (Jones 2009). A total of 13 individuals were found in the Keri Keri subpopulation in September 2024 (M. Aitkens *in litt*. January 2025; NSW Government 2025).

4. *Pterostylis pedina* has an estimated extent of occurrence (EOO) of ~141 km^2, and an estimated area of occupancy (AOO) of 28 km^2. As recommended by IUCN (2024), AOO is based on 2 x 2 km grid cells, while EOO is based on a minimum convex polygon enclosing mapped records for the species (ALA 2024; D. Egan *in litt*. October 2024; NSW Government 2025).

5. On the private property near Oolambeyan NP, *Pterostylis pedina* was found along narrow (10–50 m wide) outcrops of red-brown clay loam bordering black cracking clay (Jones 2009). In years of good rainfall these sites also contain annual forbs and grasses, but otherwise, apart from small forbs, are devoid of vegetation (N. Reid, pers. comm. in Jones 2009). The species occurs in similar habitat in Yanga SCA: on hard, red brown clay soils with a well-developed cryptogamic crust (D. Egan *in litt*. October 2024). These patches typically have less grass biomass, are dominated by *Rytidosperma* spp. (wallaby grass) and *Austrostipa* spp. (spear grass), scattered *Maireana aphylla* (cotton bush) and herbs, and have a greater inter-tussock space than the surrounding grey, self-mulching soils (D. Egan *in litt*. October 2024). The Keri Keri subpopulation occurs in habitat that is generally the same as that described for the Yanga subpopulation (M. Aitkens *in litt*. January 2025).

6. During summer and autumn, *Pterostylis pedina* persist only as underground root tubers and are not visible above-ground (D. Egan *in litt.* June 2022). Flowering occurs in October and November (Jones 2009), or as early as September, depending on the seasonal weather conditions (M. and C. Beamish *in litt*. October 2024). In dry years, flowering may only be sporadic or not occur at all (Copeland and Backhouse 2022; N. Smith *in litt*. October 2024).

7. Based on studies of morphologically similar *Pterostylis* species (Phillips *et al.* 2014; Reiter *et al.* 2019), the inferred mechanism of pollination for *Pterostylis pedina* is sexual deception of male fungus gnats (Keroplatidae and Mycetophilidae). The availability of fungus gnats to pollinate *P. pedina* may vary widely across a

landscape according to the presence of the pollinators' preferred habitat (Reiter *et al.* 2019), which is currently unknown.

8. *Pterostylis pedina* belongs within the taxonomic section '*Oligochaetochilus*' that typically reproduces from seed and does not form vegetative colonies via the production of multiple daughter tubers, as is observed in some other *Pterostylis* species (Jones and Clements 2002; Janes and Duretto 2010). Individual *P. pedina* are inferred to have a continuous lifespan through successive tuber renewals, where each year the senescing parent tuber is replaced by a single daughter tuber that grows close to the parent (Jones and Clements 2002). Generation length is unknown.

9. Orchids produce many tiny balloon-like seeds that are easily dispersed by wind and water, and may also be transported by animals in their fur, feathers, or muddy feet (Arditti and Ghani 2000). Most seeds remain in close proximity to the parent plant (D. L. Jones, pers. obs. in Jones and Clements 2002). However, evidence of maintained gene flow between disjunct sites occupied by *Pterostylis gibbosa* (Sharma *et al.* 2000) suggests that dispersal of *P. pedina* seeds beyond the parent site is likely to occur. It is inferred that successful seed germination and seedling establishment relies on colonisation by specific types of mycorrhizal fungi, with which they form symbiotic relationships that support their growth (Warcup 1981; Jusaitis and Sorensen 1993; Weston *et al.* 2005). Rainfall variability may alter the type of mycorrhizal fungi inhabiting the orchids (or available in the environment), which in turn influences whether seed germination, growth, and flowering would occur (Jones and Clements 2002; Jasinge *et al.* 2018; Bell 2022).

10. The primary threats to the persistence of *Pterostylis pedina* are habitat modification and disturbance from agriculture and infrastructure development, as well as soil disturbance and grazing by herbivores. 'Clearing of native vegetation', 'Predation, habitat degradation, competition and disease transmission by feral pigs, *Sus scrofa* Linnaeus 1758', 'Competition and grazing by the feral European rabbit, *Oryctolagus cuniculus (L.)*', and 'Competition and habitat degradation by Feral Goats, *Capra hircus* Linnaeus 1758' are listed as Key Threatening Processes under the Act.

11. *Pterostylis pedina* occurs in three threat-defined locations, which align with the three known subpopulations for the species. The most serious plausible threat that could rapidly affect all individuals in a location is habitat modification and disturbance for infrastructure development. The threat-defined locations for the Oolambeyan and Keri Keri subpopulations are designated due to their occurrence within the project area for separate proposed renewable energy projects (ERM 2024b; Umwelt 2024). The third location, which encompasses the Yanga subpopulation, may be subject to future habitat modification and disturbance associated with exploration of the mineral values of the land, subject to environmental assessment (OEH 2014).

12. There is an inferred continuing decline in the number of mature individuals and the area, extent, and quality of habitat for *Pterostylis pedina* because the species occurs in a region that has been modified for irrigated cropping (D. Egan *in litt*.

June 2022) and is now the subject of many approved and proposed renewable energy projects (Biosis 2017a, 2017b; WSP 2021; Biosis 2022; RPS 2023; WSP 2023; Biosis 2024a, 2024b; Cumberland Ecology 2024; ERM 2024a, 2024b, 2024c, 2024d, 2024e; NGH 2024; Umwelt 2024). It has been noted that *P. pedina* is not found where substantial disturbance is present (*e.g*., levee banks; N. Smith *in litt.* October 2024). Besides direct mortality or damage to tubers, disturbances associated with construction on, or adjacent to *P. pedina* habitat may render it unsuitable through changes to soil structure, water infiltration or surface flows, or the presence of suitable mycorrhizal fungi.

13. It is inferred that the activities of introduced herbivores contribute to continuing decline in the number of mature individuals, and the area, extent, and quality of habitat for *Pterostylis pedina*. Both rabbits and feral pigs may consume the flowers, rosettes, and tubers of *P. pedina*, disturb the soil surface through digging, and increase grazing pressure on surrounding vegetation, which could contribute to wind erosion and loss of topsoil (D. Egan *in litt*. June 2022). Rabbits have been observed digging up *Caladenia saggicola* (sagg spider orchid) tubers (Threatened Species Section 2017), and pig diggings have been detected in the vicinity of *P. pedina* (D. Egan *in litt*. October 2024). Feral goats (*Capra hircus*) have been found in small numbers in isolated patches in the region of Yanga SCA (DPIE 2020), though it is unknown whether they frequent *P. pedina* habitat. Domestic sheep and cattle may similarly adversely affect this species (D. Egan *in litt*. June 2022) through trampling and consumption of palatable herbage. *Pterostylis pedina* (D.L.Jones) Janes & Duretto is not eligible to be listed as a Critically Endangered species.

14. *Pterostylis pedina* (D.L.Jones) Janes & Duretto is eligible to be listed as an Endangered species as, in the opinion of the NSW Threatened Species Scientific Committee, it is facing a very high risk of extinction in Australia in the near future as determined in accordance with the following criteria as prescribed by the *Biodiversity Conservation Regulation 2017*:

Assessment against *Biodiversity Conservation Regulation 2017* criteria
The Clauses used for assessment are listed below for reference.

Overall Assessment Outcome:
Pterostylis pedina was found to be Endangered under Clause 4.3(b)(d)(e i,iii) and Clause 4.4(b)(e i,ii B).

Clause 4.2 – Reduction in population size of species
(Equivalent to IUCN criterion A)
Assessment Outcome: Data Deficient

(1) - The species has undergone or is likely to undergo within a time frame appropriate to the life cycle and habitat characteristics of the taxon:			
	(a)	for critically endangered species	a very large reduction in population size, or
	(b)	for endangered species	a large reduction in population size, or
	(c)	for vulnerable species	a moderate reduction in population size.
(2) - The determination of that criteria is to be based on any of the following:			
	(a)	direct observation,	
	(b)	an index of abundance appropriate to the taxon,	
	(c)	a decline in the geographic distribution or habitat quality,	
	(d)	the actual or potential levels of exploitation of the species,	
	(e)	the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites.	

Clause 4.3 - Restricted geographic distribution of species and other conditions
(Equivalent to IUCN criterion B)
Assessment Outcome: Endangered under Clause 4.3(b)(d)(e i,iii)

The geographic distribution of the species is:			
	(a)	for critically endangered species	very highly restricted, or
	(b)	for endangered species	highly restricted, or
	(c)	for vulnerable species	moderately restricted,
and at least 2 of the following 3 conditions apply:			
	(d)	the population or habitat of the species is severely fragmented or nearly all the mature individuals of the species occur within a small number of locations,	
	(e)	there is a projected or continuing decline in any of the following:	
		(i)	an index of abundance appropriate to the taxon,
		(ii)	the geographic distribution of the species,
		(iii)	habitat area, extent or quality,
		(iv)	the number of locations in which the species occurs or of populations of the species,
	(f)	extreme fluctuations occur in any of the following:	
		(i)	an index of abundance appropriate to the taxon,
		(ii)	the geographic distribution of the species,
		(iii)	the number of locations in which the species occur or of populations of the species.

Clause 4.4 - Low numbers of mature individuals of species and other conditions
(Equivalent to IUCN criterion C)
Assessment Outcome: Endangered under Clause 4.4(b)(e i,ii B)

The estimated total number of mature individuals of the species is:						
	(a)	for critically endangered species			very low, or	
	(b)	for endangered species			low, or	
	(c)	for vulnerable species			moderately low,	
and either of the following 2 conditions apply:						
	(d)	a continuing decline in the number of mature individuals that is (according to an index of abundance appropriate to the species):				
		(i)	for critically endangered species		very large, or	
		(ii)	for endangered species		large, or	
		(iii)	for vulnerable species		moderate,	
	(e)	both of the following apply:				
		(i)	a continuing decline in the number of mature individuals (according to an index of abundance appropriate to the species), and			
		(ii)	at least one of the following applies:			
			(A)	the number of individuals in each population of the species is:		
				(I)	for critically endangered species	extremely low, or
				(II)	for endangered species	very low, or
				(III)	for vulnerable species	low,
			(B)	all or nearly all mature individuals of the species occur within one population,		
			(C)	extreme fluctuations occur in an index of abundance appropriate to the species.		

Clause 4.5 - Low total numbers of mature individuals of species
(Equivalent to IUCN criterion D)
Assessment Outcome: Not met

The total number of mature individuals of the species is:			
	(a)	for critically endangered species	extremely low, or
	(b)	for endangered species	very low, or
	(c)	for vulnerable species	low.

Clause 4.6 - Quantitative analysis of extinction probability
(Equivalent to IUCN criterion E)
Assessment Outcome: Data Deficient

The probability of extinction of the species is estimated to be:			
	(a)	for critically endangered species	extremely high, or
	(b)	for endangered species	very high, or
	(c)	for vulnerable species	high.

Clause 4.7 - Very highly restricted geographic distribution of species– vulnerable species
(Equivalent to IUCN criterion D2)
Assessment Outcome: Vulnerable under Clause 4.7

For vulnerable species,	the geographic distribution of the species or the number of locations of the species is very highly restricted such that the species is prone to the effects of human activities or stochastic events within a very short time period.

Professor Angela Moles, FRSN
Chairperson
NSW Threatened Species Scientific Committee

Supporting Documentation:

Smith KJ (2025) Conservation Assessment of *Pterostylis pedina* (D.L.Jones) Janes & Duretto (Orchidaceae). NSW Department of Climate Change, Energy, the Environment and Water.

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