

NSW Threatened Species Scientific Committee

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 *Polystichum moorei* Christ as a CRITICALLY ENDANGERED SPECIES in Part 1 of Schedule 1 of the Act and, as a consequence, to omit reference to *Polystichum moorei* Christ from Part 2 of Schedule 1 (Endangered Species) of the Act. Listing of Critically Endangered species is provided for by Part 4 of the Act.

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 26 December 2025

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.

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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

NSW Threatened Species Scientific Committee

Public Exhibition period: 26/09/2025 – 26/12/2025

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 *Polystichum moorei* Christ as a CRITICALLY ENDANGERED SPECIES in Part 1 of Schedule 1 of the Act and, as a consequence, to omit reference to *Polystichum moorei* Christ from Part 2 of Schedule 1 (Endangered Species) of the Act. Listing of Critically Endangered species is provided for by Part 4 of the Act.

Summary of Conservation Assessment

Polystichum moorei Christ was found to be Critically Endangered in accordance with the following provisions in the *Biodiversity Conservation Regulation 2017*: Clause 4.3(a)(d)(e i,ii,iii,iv), Clause 4.4(a)(e i,ii A(I)), and Clause 4.5(a) because: (1) it has a very highly restricted geographic distribution with an extent of occurrence and area of occupancy of 4 km²; (2) it occurs in one threat-defined location; (3) it has an extremely low total number of mature individuals (estimated at 24); (4) the largest subpopulation contains an extremely low number (13) of mature individuals; and (5) continuing decline is observed in the number of mature individuals, the area of occupancy, and the extent of occurrence, and inferred in area, extent and quality of habitat and number of subpopulations, due to the effects of drought.

The NSW Threatened Species Scientific Committee has found that:

1. *Polystichum moorei* Christ (family Dryopteridaceae) is described as “terrestrial or lithophytic ferns. Rhizome short; scales dense, lanceolate, to 2 cm long, 2–5 mm broad, long-acute, brown. Fronds 3-pinnate or 2-pinnatisect; stipe 2–12 cm long; scales on stipe numerous, similar to those on rhizome, to 1.5 cm long, especially dense towards base; rachis with scattered, linear-lanceolate, brown scales to 1 cm long, especially towards base, and minute glandular hairs; lamina lanceolate in outline, 10–25 cm long, 7–14 cm broad; pinnules obliquely ovate, 0.5–2 cm long, with apices obtuse, bluntly serrate; veins not visible above. Sori ±dome-shaped, 1.5–2 mm diam., glandular; indusia orbicular” (PlantNet 2024).
2. *Polystichum moorei* is endemic to the Pacific Subtropical Islands bioregion of New South Wales (NSW) (Commonwealth DCCEEW 2024) where it is confined to a few localities on the southern mountains of Lord Howe Island (LHI) (DECC 2007; OEH 2018a).
3. The extent of occurrence (EOO) was calculated at 0.1 km² and is based on a minimum convex polygon enclosing all mapped occurrences of the species, the method of assessment recommended by IUCN (2024). The area of occupancy (AOO) is estimated to be 4 km² and was calculated using 2 x 2 km grid cells, the scale recommended by IUCN (2024). The IUCN (2024) states that “if EOO is less than AOO, EOO should be changed to make it equal to AOO to ensure consistency with the definition of AOO as an area within EOO”. Therefore, the EOO is also estimated at 4 km².
4. *Polystichum moorei* has two known subpopulations, as per the IUCN (2024) definition. Genetic analysis has shown that there is restricted gene flow between

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individuals at Erskine Creek and Mount Lidgbird, resulting in genetic divergence sufficient to consider each locality a distinct subpopulation, despite being separated by less than 1.5 km (McMaster *et al.* 2023).

5. A third subpopulation (inferred) previously occurred at Soldier Creek, approximately 2.5 km north of the two extant subpopulations. Plants in this subpopulation were confined to the calcarenite rocks approximately 30 m from the sea and around 4 m above sea level (Hutton 2001). *Polystichum moorei* was first recorded at this locality in 1898 by Joseph Maiden (RBGDT 2024). In 2001, two larger individuals and 10 juveniles (plus four desiccated/dead individuals) were recorded at this locality (Hutton 2001). By 2008, this number had declined to 10 individuals, nine of which were desiccated/dead (LHIB 2017). From 2017–2021, only a single individual persisted at this locality. Since 2021, *Polystichum moorei* has not been recorded at Soldier Creek, and following multiple follow up surveys, the species is now considered to be locally extinct at this site (C. Stehn pers. comm. November 2024).
6. The current minimum population size of *Polystichum moorei* is estimated at 24 mature individuals (C. Stehn *in litt.* November 2024). Eleven of these individuals occur in a monitoring plot at Erskine Creek and four in a monitoring plot at Mount Lidgbird, with the remaining nine individuals occurring outside of plots in the Mount Lidgbird subpopulation (C. Stehn *in litt.* December 2024).
7. *Polystichum moorei* is largely restricted to protected niches on rock faces, crevices, and caves (LHIB 2017; OEH 2018b) at elevations ranging from close to sea level to ~450 m a.s.l. (C. Stehn *in litt.* November 2024). Historically it has been found on calcareous and basalt geologies (LHIB 2017; OEH 2018b), but the loss of the Soldier Creek subpopulation means it is currently only known from basalt. The Erskine Creek subpopulation is low enough that it can experience spray from the ocean (C. Stehn pers. comm. November 2024).
8. The life history of *Polystichum moorei* is not well known (LHIB 2017). During dry periods, the species tends to die back, with the rhizome persisting within cracks of rock faces (DE 2015). This strategy has been recorded in other fern species and is thought to result in vulnerability segmentation, whereby fronds desiccate and hydraulically disconnect before the perennial stem experiences significant levels of drought-induced embolism (Suissa *et al.* 2022). Individuals of *P. moorei* which have died back during drought often regenerate within a couple of years of consistent rainfall (C. Stehn *in litt.* November 2024).
9. *Polystichum moorei* is threatened by drought and likely to be threatened by extreme rainfall events which can result in landslips, scouring and storm surges. Weed invasion is a plausible future threat. Browsing by feral goats (*Capra hircus*) may have been a historical threat (Hutton 2001). 'Anthropogenic Climate Change' is listed as a Key Threatening Process under the Act.
10. *Polystichum moorei* occurs at one threat-defined location as per the IUCN (2024) definition, due to the most serious plausible threat that results in the lowest number of locations, being drought. With the two extant subpopulations separated by only ~1.3 km, it is highly plausible a single drought would be capable of affecting all individuals of the species simultaneously.

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11. Continuing decline of *Polystichum moorei* has been observed in the number of mature individuals, the area of occupancy, and the extent of occurrence, and inferred in area, extent and quality of habitat and number of subpopulations, largely due to the effects of drought. The loss of all individuals from the Soldier Creek site (inferred to be a subpopulation) resulted not only in continuing decline in the number of mature individuals, but also continuing decline in the area of occupancy, the extent of occurrence, and the number of subpopulations. At least five mature individuals have been lost in the last ~20 years, three of which have been lost since 2017.
12. Uncertainty remains in the projected range and severity of climate change effects on Lord Howe Island. However, data from the last 50 years show ongoing declines in rainfall and cloud cover and increases in temperature (Auld and Leishman 2015). The observed decrease in rainfall in recent years, particularly in autumn and winter, has adversely affected the species, as it is dependent on seepage areas remaining moist (OEH 2018a). If rainfall and cloud cover continue to decrease and temperatures continue to increase, as has been observed on Lord Howe Island over the past 50 years (Auld and Leishman 2015), it is plausible these changes will lead to more extreme and prolonged droughts, which may in turn adversely affect the *Polystichum moorei* population in the future.
13. *Polystichum moorei* Christ is eligible to be listed as a Critically Endangered species as, in the opinion of the NSW Threatened Species Scientific Committee, it is facing an extremely 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: *Polystichum moorei* was found to be Critically Endangered under Clause 4.3(a)(d)(e i,ii,iii,iv), Clause 4.4(a)(e i,ii A(I)), and Clause 4.5(a).

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,	

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	(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: Critically Endangered under Clause 4.3(a)(d)(e i,ii,iii,iv).

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: Critically Endangered under Clause 4.4(a)(e i,ii A(I)).

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:	

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		(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: Critically Endangered under Clause 4.5(a).

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: Not met.

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.
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Professor Angela Moles, FRSN
Chairperson
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Supporting Documentation:

Saunders M (2025) Conservation Assessment of *Polystichum moorei* Christ (Dryopteridaceae). NSW Threatened Species Scientific Committee.

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Hutton I (2001) Surveys of rare plants on Lord Howe Island – June 2001. Report to NSW Scientific Committee.

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Lord Howe Island Board (LHIB) (2017) Lord Howe Island Saving our Species – Site Managed Species Final Report 2016–2017. Report to OEH ROD North.

McMaster ES, Yap J-YS, Rossetto M (2023) Conservation Genomics of *Polystichum moorei* in support of management. Research Centre for Ecosystem Resilience Publications 2023.

Office of Environment and Heritage (OEH) (2018a) Rock shield fern – profile [Online]. Available at: <https://threatenedspecies.bionet.nsw.gov.au/profile?id=10890> (accessed 18 November 2024)

Office of Environment and Heritage (OEH) (2018b) SoS Lord Howe Island Flora Monitoring Plan: Rock Shield Fern (*Polystichum moorei*). OEH: Parramatta.

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Royal Botanic Gardens and Domain Trust (RBGDT) (2024) *Polystichum moorei* specimen records [dataset]. NSW Herbarium specimen catalogue (accessed 18 November 2024)