

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 *Luturopa macleayensis* Stanistic, 2010 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.

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 27 May 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.

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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

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Public exhibition period: 27/02/2026 – 27/05/2026

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 *Luturopa macleayensis* Stanistic, 2010 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.

Summary of Conservation Assessment

Luturopa macleayensis Stanistic, 2010 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) because: 1) the species has a highly restricted geographic distribution with an extent of occurrence of 408 km² and area of occupancy of 12 km²; 2) the population is found within one threat-defined location; and 3) there is an inferred continuing decline in the area, extent, and quality of habitat, and the number of mature individuals, due to adverse fire regimes, namely high and moderate severity fire and high frequency fire, and drought.

The NSW Threatened Species Scientific Committee has found that:

1. *Luturopa macleayensis* Stanistic, 2010 (Charopidae), the Macleay waxy pinwheel snail, is described based on shell characters only, as follows: “Shell very small, yellowish grey, depressedly trochoidal with a slightly raised spire; whorls subangulate and shouldered, sutures impressed; protoconch sculptured with weak radial ribs, teleoconch with irregular radial ribs and weak spiral lirae, microsculpture indistinct, consisting of microradial threads and low microspiral cords; umbilicus narrowly open, V-shaped; diameter 4.2 mm” (Stanistic *et al.* 2010).
2. *Luturopa macleayensis* is currently known from the Macleay Valley in northeastern New South Wales (NSW) (Stanistic *et al.* 2010; Foon *et al.* 2022). Occurrence records are distributed west and northwest of Kempsey, extending to The Castles Nature Reserve approximately 50 km west of Kempsey, with one record slightly further northwest (Stanistic *et al.* 2010; Esri 2021; Foon *et al.* 2022; ALA 2024a). The species is only known from five collection events at four sites (Stanistic *et al.* 2010; Foon *et al.* 2022; F. Köhler and J.K. Foon *in litt.* March 2023; ALA 2024a).
3. Current survey data are insufficient to accurately assess *Luturopa macleayensis* abundance (Foon *et al.* 2022; F. Köhler and J.K. Foon *in litt.* March 2023) or the number of mature individuals, although the species appears to be naturally in low abundance and patchily distributed (Foon *et al.* 2022; F. Köhler and J.K. Foon *in litt.* March 2023). Only seven individuals have ever been collected (F. Köhler and J.K. Foon *in litt.* March 2023; ALA 2024a; J.K. Foon pers. obs).
4. *Luturopa macleayensis* has a highly restricted geographic distribution. The Extent of Occurrence (EOO) is estimated to be 408 km² and is calculated as a minimum

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convex polygon containing all known occurrences, the method of assessment recommended by IUCN (2024). The Area of Occupancy (AOO) is estimated to be 12 km² based on 2 x 2 km grid cells, the scale recommended by IUCN (2024).

5. *Luturopa macleayensis* occurs in dry vine thickets in rainforest and limestone habitats where it is found in leaf litter (Stanisic *et al.* 2010; Foon *et al.* 2022; F. Köhler and J.K. Foon *in litt.* March 2023). The species is more likely to be encountered on limestone outcrops compared to non-limestone habitats (Stanisic *et al.* 2010; Foon *et al.* 2022; F. Köhler and J.K. Foon *in litt.* March 2023). Rainforests and limestone outcrops provide favourable habitat for *L. macleayensis* and many other land snails (e.g. Foon *et al.* 2022) as they contain high levels of moisture, food and sheltering sites, specifically leaf litter, crevices, rock piles and debris (Stanisic 1997).
6. Little is known about behaviour and life history. *Luturopa macleayensis* is only active at night but is also likely able to tolerate some drier weather via aestivation (F. Köhler and J.K. Foon *in litt.* March 2023). *L. macleayensis* is inferred to move < 50 m in its entire lifetime due to its relatively small size (F. Köhler and J.K. Foon *in litt.* March 2023). *L. macleayensis* is inferred to be a detritus feeder, feeding on various ground substrate items such as fungi and/or organic decaying matter found in its leaf litter habitat (F. Köhler and J.K. Foon *in litt.* March 2023). As with all pulmonate land snails, the species is hermaphroditic and lays eggs (F. Köhler and J.K. Foon *in litt.* March 2023), but no further reproductive information is known.
7. The primary threat to *Luturopa macleayensis* is adverse fire regimes, particularly high and moderate severity fire and high frequency fire. 'High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition' is listed as a Key Threatening Process under the Act.
8. *Luturopa macleayensis* is highly susceptible to direct mortality from fire and associated heat due to its small, soft body and fragile, thin shell that provide minimal protection (Stanisic and Ponder 2004; Decker *et al.* 2023). Furthermore, the species' poor dispersal ability prevents escape from fires (Stanisic and Ponder 2004) and likely delays post-fire recovery as the species' capacity to recolonise previously burnt sites is limited (Foon *et al.* 2022; F. Köhler and J.K. Foon *in litt.* March 2023). High and moderate severity fire destroys and degrades leaf litter and other potential ground layer shelter habitat such as woody debris, and can open the forest canopy layer, likely causing land snail declines in abundance (Foon *et al.* 2022; Decker *et al.* 2023) as habitat moisture is lost and desiccation risk increases (Baker 1958; Getz 1974; Martin and Sommer 2004; Foon *et al.* 2022). If high or moderate severity fires are too frequent, unburnt leaf-litter habitat will become scarce over time and result in lower snail abundance (Decker *et al.* 2023). The species is highly susceptible to direct mortality from fire and associated heat due to its small, soft body and fragile, thin shell that provide minimal protection (Stanisic and Ponder 2004; Decker *et al.* 2023).

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9. A number of studies have estimated the proportion of habitat impacted by the 2019/2020 fires and the population declines that resulted from that event (DAWE 2020, Legge *et al.* 2021, Marsh *et al.* 2021, Foon *et al.* 2022, DPIE 2020). Post-fire ground surveys by Foon *et al.* (2022) found one *L. macleayensis* site in unburnt limestone habitat. Although most preferred (*i.e.* limestone) habitat was only lightly burnt or unburnt (Foon *et al.* 2022; F. Köhler and J.K. Foon *in litt.* March 2023), most of the species' distribution was nonetheless within the fire zone and burnt to varying severity levels (DPIE 2020; Foon *et al.* 2022), including moderate to extreme in some patches (DPIE 2020). For this reason, a > 50% total population decline from increased mortality during and after the fires, and a decline in quality of habitat, is inferred (Foon *et al.* 2022; F. Köhler and J.K. Foon *in litt.* March 2023). Another post-fire field study by Decker *et al.* (2023) found high and moderate severity fires caused a 12–75% population decline in charopid land snails and a 75% decline in overall micro-snail (*i.e.* species less than 5 mm) abundance in southeastern Australia after the 2019–2020 bushfires. Given that moderate, high and extreme burn intensities were mapped in the distribution of *L. macleayensis* (DPIE 2020), a continuing decline is inferred in area, extent and quality of habitat, and the number of mature individuals, due to recent adverse fire regimes. A slight annual increase in severe fire weather days is projected for the NSW North Coast region by 2079 due to climate change (Adapt NSW 2024). Similarly, a harsher fire-weather climate is also projected for the region in the future, but the magnitude of the change is uncertain (CSIRO and BOM 2024). It is inferred that these changes will lead to more frequent and severe fires, further threatening the *L. macleayensis* population in the future.
10. As with adverse fire regimes, the biological traits of *Luturopa macleayensis* (Stanisic *et al.* 2010; F. Köhler and J.K. Foon *in litt.* March 2023), make it prone to desiccation and mortality from drought conditions (Stanisic and Ponder 2004). Although the species may survive dry conditions by aestivating (Stanisic and Ponder 2004; F. Köhler and J.K. Foon *in litt.* March 2023), most Australian land snails are reliant on at least partial environmental moisture availability (Stanisic and Ponder 2004; Stanisic and Window 2020; Foon *et al.* 2022). Foon *et al.* (2022) suggested that extreme drought, which preceded the 2019–2020 bushfires and was exacerbated by climate change (Abram *et al.* 2021), might have caused significant pre-fire mortality in land snails. High or moderate severity fire, or high frequency fire, exacerbate the adverse effects of drought by destroying or degrading moisture-retaining habitat. Drought also reduces habitat and food resources pre- and post-fire (Keith *et al.* 2022).
11. *Luturopa macleayensis* is known from one threat-defined location based on the threat of adverse fire regimes. Analyses have already shown that most of the species' distribution was burnt during the 2019–2020 bushfires (Foon *et al.* 2022). The species' geographic distribution remains highly restricted, and with the projected future increase in fire weather due to climate change (Abram *et al.* 2021; Adapt NSW 2024, CSIRO and BOM 2024), it is highly plausible that a single fire event could adversely affect the species across its entire distribution within a very short time frame.

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12. *Luturopa macleayensis* Stanisic, 2010 is not eligible to be listed as a Critically Endangered species.

13. *Luturopa macleayensis* Stanisic, 2010 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:

Luturopa macleayensis was found to be Endangered under Clause 4.3(b)(d)(e i,iii).

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,	

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	(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: Data Deficient

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.	

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**Clause 4.5 - Low total numbers of mature individuals of species
(Equivalent to IUCN criterion D)
Assessment Outcome: Data Deficient**

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.
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Professor Angela Moles, FRSN
Chairperson
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Supporting Documentation:

Portway, C (2025) Conservation Assessment of *Luturopa macleayensis* Stanistic, 2010. New South Wales Department of Climate Change, Energy, the Environment and Water.

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