

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 *Rhophodon mcgradyorum* Hyman & Stanistic, 2005 as a CRITICALLY ENDANGERED SPECIES in Part 1 of Schedule 1 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 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 *Rhophodon mcgradyorum* Hyman & Stanisc, 2005 as a CRITICALLY ENDANGERED SPECIES in Part 1 of Schedule 1 of the Act. Listing of Critically Endangered species is provided for by Part 4 of the Act.

Summary of Conservation Assessment

Rhophodon mcgradyorum Hyman & Stanisc, 2005 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,iii) because: 1) the species has a very highly geographic distribution with an extent of occurrence of (4–8 km²) and area of occupancy of (4–8 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 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. *Rhophodon mcgradyorum* Hyman & Stanisc, 2005 (Charopidae), McGrady's pinwheel snail, is described based on shell characters only, as follows: "Shell very small, golden brown to yellow, with 4.5-4.9 (mean 4.7) tightly coiled whorls, the last descending more rapidly in front. Shell diameter 1.64-1.69 mm (mean 1.67 mm). Apex and early spire slightly concave to flat. Height of shell 0.82-0.99mm (mean 0.88 mm), H/D 0.50-0.59 (mean 0.53). Protoconch exsert of 1.7-1.8 whorls. Apical sculpture of curved, moderately spaced, radial ribs, becoming more crowded toward protoconch/teleoconch boundary; width of interstices (in multiples of rib width) 6 at apex, 3 at post-nuclear boundary; secondary sculpture of weak, discontinuous spiral cords. Teleoconch sculpture of numerous, protractively sinuated widely spaced radial ribs; 35-47 (mean 42) ribs on last whorl. Ribs/mm 6.79-8.96 (mean 8.04). Ribs relatively broad, height less than width; straight in section, rounded on top. Rib interstices on first post-nuclear whorl equal to width of 4-6 ribs; interstices on penultimate whorl equal to width of 7 ribs. Interstitial sculpture of microradial riblets and fine microspirals. Microradial riblets low, 12-13 between ribs on first post-nuclear whorl and 20 between ribs on penultimate whorl; microspirals low, crossing major radials, forming strong, round to square beads at their intersection with microradial riblets. Umbilicus widely open, saucer-shaped, diameter 0.61-0.64 mm (mean 0.63 mm). D/U 2.61-2.67 (mean 2.68). Sutures impressed, whorls evenly rounded above and below periphery. Aperture ovately lunate, parietal callus present. Three parietal barriers, one baso-columellar barrier and four palatal barriers present; barriers thickened (Hyman & Stanisc 2005).
2. *Rhophodon mcgradyorum* is currently known only from Bellbird Gully, Gibraltar Range National Park (NP) (Hyman & Stanisc 2005; Foon *et al.* 2022), in

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northeastern New South Wales (NSW). The species is known only from two sites (F. Köhler and J.K. Foon *in litt.* March 2023), comprising only three collection events (Foon *et al.* 2022; F. Köhler and J.K. Foon *in litt.* March 2023; ALA 2024).

3. Current survey data are insufficient to accurately assess *Rhophodon mcgradyorum* abundance (Foon *et al.* 2022; F. Köhler and J.K. Foon *in litt.* March 2023) or in turn the number of mature individuals, although the number of individuals found relative to survey effort suggests the species could be naturally rare and in low abundance (Stanisic 1990; Hyman & Stanisic 2005; Stanisic *et al.* 2010; Foon *et al.* 2022; F. Köhler and J.K. Foon *in litt.* March 2023). Only nine individuals have ever been collected (F. Köhler and J.K. Foon *in litt.* March 2023; ALA 2024; J.K. Foon pers. obs).
4. *Rhophodon mcgradyorum* has a very highly restricted geographic distribution. The Extent of Occurrence (EOO) is estimated to be 8 km² and was calculated to match AOO, as recommended by IUCN (2024) when the original EOO is smaller than AOO. The Area of Occupancy (AOO) is estimated to be 8 km² based on 2 x 2 km grid cells, the scale recommended by IUCN (2024).
5. *Rhophodon mcgradyorum* occurs in rainforest on limestone, where it is found in leaf litter (Hyman & Stanisic 2005; Stanisic *et al.* 2010; Foon *et al.* 2022; F. Köhler and J.K. Foon *in litt.* March 2023). The species is restricted to southern slopes of the Gibraltar Range, which receive higher rainfall and have suitable rainforest habitat, compared to the drier eucalypt forests north and west (F. Köhler and J.K. Foon *in litt.* March 2023).
6. Little is known about behaviour and life history. *Rhophodon mcgradyorum* is only active at night after rain and has only been found in leaf litter (F. Köhler and J.K. Foon *in litt.* March 2023). While this suggests that *R. mcgradyorum* is dependent on moist habitat, the species is also likely able to tolerate some drier weather via aestivation (F. Köhler and J.K. Foon *in litt.* March 2023). *Rhophodon mcgradyorum* 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). *Rhophodon mcgradyorum* 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 *Rhophodon mcgradyorum* 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. *Rhophodon mcgradyorum* 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,

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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.* February 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 more scarce over time, resulting in lower snail abundance (Decker *et al.* 2023).

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). 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 abundance. As moderate burn intensities to leaf litter and understorey habitat were recorded at one of only two known *Rhophodon mcgradyorum* sites (Foon *et al.* 2022), a continuing decline is inferred in area, extent and quality of habitat, and the number of mature individuals, due to recent adverse fire regimes. An annual increase of approximately two severe fire weather days is projected for the New England and North West 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 severe and more frequent fires, further threatening the *R. mcgradyorum* population in the future.
10. As with adverse fire regimes, *Rhophodon mcgradyorum*'s biological traits (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. *Rhophodon mcgradyorum* is known from one threat-defined location based on the threat of adverse fire regimes. Foon *et al.* (2022) has already shown that 100% of the species' distribution was within the 2019–2020 bushfires fire zone (DPIE 2020; Foon *et al.* 2022) and that the fires were inferred to have caused a population decline of < 50%. The species' geographic distribution remains very highly

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restricted, and with the projected future increase in severe 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 again adversely affect the species across its entire distribution within a very short time frame.

12. *Rhophodon mcgradyorum* Hyman & Stanisic, 2005 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 immediate 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:

Rhophodon mcgradyorum was found to be Critically Endangered under Clause 4.3(a)(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 criterion 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: Critically Endangered under Clause 4.3(a)(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

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	(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: 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,

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		(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
NSW Threatened Species Scientific Committee

Supporting Documentation:

Portway, C (2025) Conservation Assessment of *Rhophodon mcgradyorum* Hyman & Stanisic, 2005. New South Wales Department of Climate Change, Energy, the Environment and Water.

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