



## Consultation on Species Listing Eligibility and Conservation Actions

### *Galaxias terenasus* (roundsnout galaxias)

You are invited to provide your views and supporting reasons related to:

- 1) the eligibility of *Galaxias terenasus* (roundsnout galaxias) for inclusion on the EPBC Act threatened species list in the Endangered category and
- 2) the necessary conservation and recovery actions for the above species.

The purpose of this consultation document is to elicit additional information to better understand the status of the species and help inform on conservation actions and further planning. As such, the draft assessment should be considered to be **tentative** as it may change following responses to this consultation process.

Evidence provided by experts, stakeholders and the general public are welcome. Responses can be provided by any interested person.

Anyone may nominate a native species, ecological community or threatening process for listing under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) or for a transfer of an item already on the list to a new listing category. The Threatened Species Scientific Committee (the Committee) undertakes the assessment of species to determine eligibility for inclusion in the list of threatened species and provides its recommendation to the Australian Government Minister for the Environment.

Responses are to be provided in writing by email to:  
[species.consultation@environment.gov.au](mailto:species.consultation@environment.gov.au). Please include species scientific name in Subject field.

or by mail to:

The Director (Marine and Freshwater Species Conservation Section)  
Protected Species and Communities Branch  
Biodiversity Conservation Division  
Australian Government Department Agriculture, Water and the Environment  
(Attention: [species.consultation@environment.gov.au](mailto:species.consultation@environment.gov.au))  
GPO Box 858  
CANBERRA ACT 2601

**Responses are required to be submitted by 05 April 2022.**



## **General background information about listing threatened species**

The Australian Government helps protect species at risk of extinction by listing them as threatened under Part 13 of the EPBC Act. Once listed under the EPBC Act, the species becomes a Matter of National Environmental Significance (MNES) and must be protected from significant impacts through the assessment and approval provisions of the EPBC Act. More information about threatened species is available on the department's website at: <http://www.environment.gov.au/biodiversity/threatened/index.html>.

Public nominations to list threatened species under the EPBC Act are received annually by the department. In order to determine if a species is eligible for listing as threatened under the EPBC Act, the Threatened Species Scientific Committee (the Committee) undertakes a rigorous scientific assessment of its status to determine if the species is eligible for listing against a set of criteria. These criteria are available on the Department's website at: <http://www.environment.gov.au/system/files/pages/d72dfd1a-f0d8-4699-8d43-5d95bbb02428/files/tssc-guidelines-assessing-species-2018.pdf>.

As part of the assessment process, the Committee consults with the public and stakeholders to obtain specific details about the species, as well as advice on what conservation actions might be appropriate. Information provided through the consultation process is considered by the Committee in its assessment. The Committee provides its advice on the assessment (together with comments received) to the Minister regarding the eligibility of the species for listing under a particular category and what conservation actions might be appropriate. The Minister decides to add, or not to add, the species to the list of threatened species under the EPBC Act. More detailed information about the listing process is at: <http://www.environment.gov.au/biodiversity/threatened/nominations.html>.

To promote the recovery of listed threatened species and ecological communities, conservation advices and where required, recovery plans are made or adopted in accordance with Part 13 of the EPBC Act. Conservation advices provide guidance at the time of listing on known threats and priority recovery actions that can be undertaken at a local and regional level. Recovery plans describe key threats and identify specific recovery actions that can be undertaken to enable recovery activities to occur within a planned and logical national framework. Information about recovery plans is available on the department's website at: <http://www.environment.gov.au/biodiversity/threatened/recovery.html>.

## **Privacy notice**

The Department will collect, use, store and disclose the personal information you provide in a manner consistent with the Department's obligations under the Privacy Act 1988 (Cth) and the Department's Privacy Policy.

Any personal information that you provide within, or in addition to, your comments in the threatened species assessment process may be used by the Department for the purposes of its functions relating to threatened species assessments, including contacting you if we have any questions about your comments in the future.

Further, the Commonwealth, State and Territory governments have agreed to share threatened species assessment documentation (including comments) to ensure that all States and Territories have access to the same documentation when making a decision on the status of a potentially threatened species. This is also known as the '[Common Assessment Method](#)' (CAM). As a result, any personal information that you have provided in connection with your comments may be shared between Commonwealth, State or Territory government entities to assist with their assessment processes.



The Department's Privacy Policy contains details about how respondents may access and make corrections to personal information that the Department holds about the respondent, how respondents may make a complaint about a breach of an Australian Privacy Principle, and how the Department will deal with that complaint. A copy of the Department's Privacy Policy is available at: <https://www.awe.gov.au/about/commitment/privacy> .

### **Information about this consultation process**

Responses to this consultation can be provided electronically or in hard copy to the contact addresses provided on Page 1. All responses received will be provided in full to the Committee and then to the Australian Government Minister for the Environment.

In providing comments, please provide references to published data where possible. Should the Committee use the information you provide in formulating its advice, the information will be attributed to you and referenced as a 'personal communication' unless you provide references or otherwise attribute this information (please specify if your organisation requires that this information is attributed to your organisation instead of yourself). The final advice by the Committee will be published on the department's website following the listing decision by the Minister.

Information provided through consultation may be subject to freedom of information legislation and court processes. It is also important to note that under the EPBC Act, the deliberations and recommendations of the Committee are confidential until the Minister has made a final decision on the nomination, unless otherwise determined by the Minister.

## **Consultation questions**

*Please note, this list of questions is provided as a guide only. Respondents are not required to address every question.*

### **Species information**

- 1) Do you agree with the current taxonomic position of the Australian Faunal Directory for roundsnout galaxias (as identified in the draft conservation advice)?
  - a. Do you have any additional references or information relating to the taxonomic status of this species, in particular the divergence of the Cann River population (*Galaxias* sp. 17 'Cann')?
- 2) Can you provide any additional references, information or estimates regarding the description and morphology of the species in the draft conservation advice?
- 3) Can you provide any additional references, information or estimates regarding the distribution of the species in the draft conservation advice?
  - a. Do you agree with the modelled distribution of the species (Map 1) provided in the draft conservation advice?
  - b. Are there additional subpopulations of the species not identified in the draft conservation advice?
- 4) Can you advise of the cultural significance of this species to Indigenous peoples?
- 5) Can you provide any additional references, information or estimates regarding the biology or ecology of the species not in the draft conservation advice?
  - a. Do you have any information regarding the spawning habitat of the species?
  - b. Can you provide an estimate of the life expectancy for the species, including age of maturity and generation length, with supporting evidence?
- 6) Is the description of '*habitat critical to the survival*' of roundsnout galaxias valid? If not, can you provide a description of relevant areas identified as critical habitat?
- 7) Do you consider that all threats (Table 1) to species have been identified and described adequately? If not, are you able to provide additional or alternative information on threats, past, current, or potential that may adversely affect the species at any stage of its life cycle, with supporting references?
  - a. To what degree are the identified threats likely to impact on the species in the future?
- 8) Do you consider that the conservation and recovery actions listed (page 11) have been adequately identified? If not, can you provide management advice for the following:
  - a. Any additional or alternative specific conservation and recovery actions that would aid in the protection of the species?
  - b. Any planning and management actions that are currently in place supporting protection and recovery of the species. To what extent have they been effective?
  - c. Are there additional planning and management actions that have not been implemented that will aid in the protection and recovery of the species?
  - d. What individuals or organisations are currently, or need to be, involved in planning to abate threats and any other relevant planning issues?
  - e. Are there additional survey, monitoring or research priorities that will support the protection and recovery of the species? To what extent have current priorities (if any) been successful?

## Assessment criteria

- 9) Do you agree with the assessment finding of roundsnout galaxias across its entire national extent as Endangered in the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) threatened species list? If you consider the species to be eligible for threatened species listing other than Endangered, provide detailed evidence against the listing criteria for its entire national extent.
- 10) Has the survey effort for this species been adequate to determine adult population size?
- 11) Do you agree with the estimate provided in the assessment for the current population size of the species?
- 12) For current roundsnout galaxias subpopulations with which you are familiar, are you able to provide a plausible estimate on abundance based on your own knowledge? If so, please provide in the form for (1) national extent and/or (2) NSW or Vic subpopulations:
  - a. Lower bound (estimated minimum):
  - b. Upper bound (estimated maximum):
  - c. Best Estimate:
  - d. Estimated level of Confidence (%):
- 13) Are you able to provide an estimate in the number of mature individuals across the species 1) national extent and/or (2) NSW or Vic subpopulations?
- 14) Are you able to provide any evidence that extreme fluctuations in the number of mature individuals occurs in this species?
- 15) Are you able to provide an estimate of trends (stable or increasing or declining) in the roundsnout galaxias' total population size over the assessment period between 2011-20 (within 3-generations)?
- 16) Has the survey effort for this species been adequate to determine its national distribution?
- 17) Do you agree with the estimates of the current extent of occurrence (EOO) and area of occupancy (AOO) provided in the assessment? If not, can you provide an estimate of the current geographic distribution (EOO and AOO in km<sup>2</sup>), with supporting data?
- 18) Has this geographic distribution declined and if so by how much and over what period of time?
- 19) Can you provide any (other) additional data or information relevant to this assessment?



# Contents

<b>Conservation Advice for <i>Galaxias terenasus</i> (roundsnout galaxias)</b>	<b>1</b>
Conservation status	1
Species information	3
Taxonomy	3
Description	3
Distribution	3
Cultural and community significance	5
Relevant biology and ecology	5
Habitat critical to the survival	6
Threats	6
Conservation and recovery actions	11
Primary conservation outcome	11
Conservation and management priorities	11
Stakeholder engagement/community engagement	12
Survey and monitoring priorities	12
Information and research priorities	13
Links to relevant implementation documents	14
Conservation Advice and Listing Assessment references	14
Attachment A: Listing Assessment for <i>Galaxias terenasus</i>	20
Reason for assessment	20
Assessment of eligibility for listing	20
Key assessment parameters	20
Criterion 1 evidence	22
Criterion 2 evidence	24
Criterion 3 evidence	25
Criterion 4 evidence	26
Criterion 5 evidence	27
Adequacy of survey	27
Listing and Recovery Plan Recommendations	27



# Conservation Advice for *Galaxias terenusus* (roundsnout galaxias)

**This draft document is being released for consultation on the species listing eligibility and conservation actions**

The purpose of this consultation document is to elicit additional information to better understand the eligibility of the species for listing and inform conservation actions, further planning and the potential need for a Recovery Plan.

The draft assessment below should therefore be considered **tentative** at this stage, as it may change as a result of responses to this consultation process.

Note: Specific consultation questions relating to the below draft assessment and preliminary determination have been included in the consultation cover paper for your consideration.



*Galaxias terenusus*® Copyright, Rudie Kuitert (From Victoria's Galaxiid Fishes)

## Conservation status

*Galaxias terenusus* (roundsnout galaxias) is proposed to be listed in the Endangered category of the threatened species list under the *Environment Protection and Biodiversity Conservation Act 1999*.

Attachment A.

The Committee assessment of the species' eligibility against each of the listing criteria is:

- Criterion 1: Insufficient data
- Criterion 2: B1ab(iii,iv) + B2ab(iii,iv): Endangered
- Criterion 3: Insufficient data
- Criterion 4: Insufficient data
- Criterion 5: Insufficient data

The main factors that make roundsnout galaxias eligible for listing in the Endangered category are its decline in quality of habitat from climate change causing extreme weather events such as drought and bushfires which affects the species entire range. Roundsnout galaxias is also threatened from predatory introduced trout species (brown (*Salmo trutta*) and rainbow trout (*Oncorhynchus mykiss*)) invading the species' remaining small subpopulations.

Species can also be listed as threatened under state and territory legislation. For information on the current listing status of this species under relevant state or territory legislation, see the [Species Profile and Threat Database](#).

DRAFT



# THREATENED SPECIES SCIENTIFIC COMMITTEE

Established under the *Environment Protection and Biodiversity Conservation Act 1999*

The Threatened Species Scientific Committee finalised this assessment on DD Month Year.

## Species information

### Taxonomy

Conventionally accepted as *Galaxias terenasus* (Raadik 2014).

*Galaxias terenasus* was previously known as *Galaxias olidus* (Günther 1866), an unresolved species complex (Raadik 2011). In 2014, this complex was revised and subsequently 12 new taxa, including *G. terenasus*, were formally described (Raadik 2014). This taxonomic revision also identified two genetically distinct subpopulations of *G. terenasus* (see *Distribution*).

Recent taxonomic studies have indicated that the subpopulation of *G. terenasus* in the Cann River (*Galaxias* sp. 17 'Cann') as genetically divergent to the other *G. terenasus* subpopulations (TA Raadik 2021. pers comm 8 July). The Cann River subpopulation is yet to be formally described, and until then, the Cann River subpopulation, for the purposes of this threatened species listing assessment is considered to be *G. terenasus*.

Common names: roundsnout galaxias (Raadik 2014).

### Description

*Galaxias terenasus* (roundsnout galaxias) is a typical galaxiid fish with an elongate and tubular body, lacking scales, with a lateral line and soft-rayed fins (Merrick & Schmida 1984; McDowall & Fulton 1996). Roundsnout galaxias is a diminutive fish, weighing up to 3 g and reaching a maximum length of 80 mm, but more commonly between 45–70 mm (Raadik 2011, 2014). While the species is similar in appearance to many other galaxiid species, in particular *Galaxias parvus* (swamp galaxias), it is distinguished by a small head, rounded snout, small mouth, and a large eye that is approximately a quarter of the total head size (Raadik 2011, 2014). All fins are thin, soft-rayed, spineless, and translucent (Raadik 2011, 2014). Roundsnout galaxias will vary slightly in its morphological features between river catchments, however generally the species is pale olive-brown in colour with distinctive and irregular-shaped dark blotches on the head, back and sides of the body above the lateral line and a silvery-white belly (Raadik 2011). Juvenile roundsnout galaxias are less conspicuous in colour and are predominately whitish-cream which darkens into its adult colour with growth (Kuitert 2018).

### Distribution

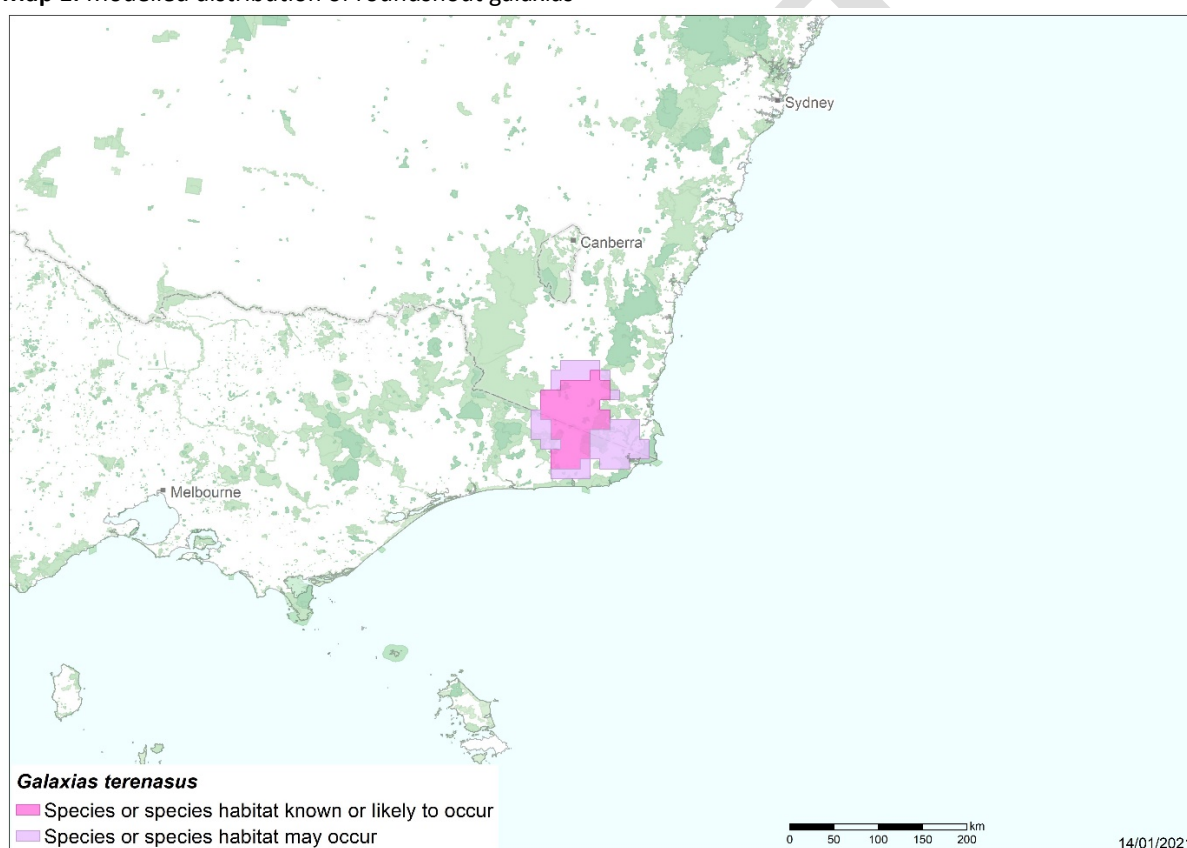
Roundsnout galaxias is endemic to the freshwater rivers in the mid-catchment of the Snowy River and East Gippsland catchments of south-eastern Australia in New South Wales (NSW) and Victoria (Raadik 2011, 2014, 2019a; FoA 2020). In NSW, the species is found in the following rivers, Snowy, MacLaughlin, Delegate/Bombala and the upper Genoa (Raadik 2011, 2014, 2019a; NSW DPI – Fisheries Aquatic Ecosystems Research database 2021). In Victoria, the species occurs in the Genoa River from the NSW/Victoria border and in the mid-to-upper Cann River (Raadik 2011, 2014, 2019a; Vic TSA 2020). The species is absent from the upper reaches of all these river systems, which may be due to the presence of introduced predators such as trout (Raadik 2011, 2014, 2019a). This is evident in the Cann River where they restrict the movement of roundsnout galaxias into these areas (Vic TSA 2020).

Across its distribution, roundsnout galaxias is known to coexist with other *Galaxias* species. The species coexists with *G. olidus* (mountain galaxias) in the Snowy River, with *G. brevipinnis*

(climbing galaxias) in the Genoa and Cann rivers and potentially with *G. maculatus* (common galaxias) in the Genoa River (Raadik 2011, 2014). Roundsnout galaxias has also been found in areas where introduced predatory fish occur, such as brown trout (*Salmo trutta*) (Raadik 2011, 2014).

While recent population genetic analysis indicates that the Cann River subpopulation (*Galaxias* sp. 17 'Cann') is genetically divergent (TA Raadik 2021. pers comm 8 July), the *G. olidus* species complex revision by Raadik (2014) initially identified two genetically distinct roundsnout galaxias lineages, one each in the Snowy River catchment and the Genoa River (which included the Cann River subpopulation). Morphological variation analysis between these lineages are ongoing, with indications of differences between the roundsnout galaxias population and Cann River subpopulation (TA Raadik 2021. pers comm 8 July).

**Map 1:** Modelled distribution of roundsnout galaxias



**Source:** Base map Geoscience Australia; species distribution data [Species of National Environmental Significance](#) database.

**Caveat:** The information presented in this map has been provided by a range of groups and agencies. While every effort has been made to ensure accuracy and completeness, no guarantee is given, nor responsibility taken by the Commonwealth for errors or omissions, and the Commonwealth does not accept responsibility in respect of any information or advice given in relation to, or as a consequence of, anything containing herein.

## **Cultural and community significance**

The significance of roundsnout galaxias' spiritual and other cultural values are diverse and varied for the many Indigenous peoples that live in the area and care for Country. This section describes some examples of this significance but is not intended to be comprehensive or applicable to, or speak for, all Indigenous people. Such knowledge may be only held by Indigenous groups and individuals who are the custodians of this knowledge.

Roundsnout galaxias is found on Ngarigo, Yuin, Bidwell and Kurnai Indigenous Country and may hold significance to the Indigenous people on the land in which the species occurs, noting the species historical detections (1914, 1938, 1965) within its NSW range (Raadik 2014, 2019a). However, there is insufficient evidence to determine the exact significance of roundsnout galaxias and further work is required to ascertain the significance of this species to Indigenous people.

Like many of the other galaxiid species (due to its diminutive size), roundsnout galaxias is not targeted by commercial or recreational fishers as either a 'sport' or 'table' fish.

## **Relevant biology and ecology**

Roundsnout galaxias is confined to freshwater and is not expected to undertake any diadromous migrations (Raadik 2011, 2014; Vic TSA 2020). Adult roundsnout galaxias are solitary, while juveniles are found in shoals (Raadik 2011, 2014).

Similar to other galaxiid species, male roundsnout galaxias are generally smaller than females. Both sexes mature at lengths between 30–35 mm with females becoming gravid between 52–63 mm (Raadik 2011, 2014; Vic TSA 2020). The time of year at which spawning occurs varies between catchments but is generally from spring to early summer each year, with females producing between 220–240 unshed eggs which are approximately 1.2 mm in diameter (Raadik 2011, 2014; Vic TSA 2020). Spawning site selection is unknown, but given its former taxon (mountain galaxias), it is suspected that eggs are demersal, laid in masses and settles on rocky substrates (McDowall & Frankenberg 1981; Allen et al. 2002).

The maximum life expectancy for roundsnout galaxias has not yet been accurately determined. However, a plausible estimate can be made given its similarities to the former overarching taxon, mountain galaxias, which is between 3–4 years, where sexual maturity for both sexes may occur by the end of their first year (0+) with all fish mature by the end of their second year (1+) (McDowall & Fulton 1996; Allen et al. 2002; Vic TSA 2020). Sexual differentiation in roundsnout galaxias means that all individuals that are 3+ will be female (McDowall & Fulton 1996), suggesting that the species is most likely to spawn between 1–3 years of age.

Roundsnout galaxias is found in clear and slow-moderate flowing creeks and rivers (0.1–0.6 m in depth and 10–12 m in width) between elevations of 250–785 m a.s.l (above sea level) in a variety of lotic conditions and habitats, from pools, glides, riffles, and areas of still backwaters that are sheltered by varying densities of vegetation (Raadik 2011, 2014, 2019a; Vic TSA 2020). Adult roundsnout galaxias prefer deeper pools while juveniles will congregate in shallower water near the banks of waterways (Raadik 2016). Additionally, during periods of no or low flow, fish can be found in remnant pools or in the areas between rocks and cobbles which retain water (Raadik 2016). The species has also been detected in stream habitats which have been heavily modified for agricultural grazing (Raadik 2011, 2014, 2019a; Vic TSA 2020). Within

these cleared streams, the species prefers substrates consisting of bedrock, coarse sand, and over smaller substrates of pebble, gravel, and silt (Raadik 2011, 2014, 2019a; Vic TSA 2020). Instream habitat cover is usually from rock, timber debris, aquatic, and overhanging vegetation (Raadik 2011, 2014, 2019a; Vic TSA 2020).

### Habitat critical to the survival

Roundsnout galaxias is predominately found in three river systems (Snowy, Cann and Genoa) across two river catchments (Snowy and East Gippsland) (see *Distribution*). The habitat where the species occur can be defined as habitat critical to the survival of the species (see *Relevant biology and ecology*), in particular areas of these rivers where the species movement and reproduction may be restricted as a result of a single or multiple threatening process(es) (see *Threats*). Areas currently unoccupied by roundsnout galaxias may still represent habitat critical to the survival if future recruitment would enable colonisation of unoccupied streams and rivers in the Snowy and East Gippsland catchments.

No Critical Habitat as defined under section 207A of the EPBC Act has been identified or included in the Register of Critical Habitat.

### Threats

The threats to roundsnout galaxias are similar to other *Galaxias* species, in particular *G. fuscus* (barred galaxias) (Raadik 2019a). The species is threatened by introduced predatory trout (both brown and rainbow trout species), climate change leading to extreme events, in particular drought, floods, and bushfires; forestry and agriculture operations resulting in a decline of quality habitat, and diseases and parasites (Raadik 2011, 2014, 2019; Vic TSA 2020).

**Table 1:** Threats impacting roundsnout galaxias.

Threat	Status	Evidence
Introduced species		
Increased predation and competition	<ul style="list-style-type: none"> <li>• Timing: historic/current</li> <li>• Confidence: known</li> <li>• Likelihood: almost certain</li> <li>• Consequence: catastrophic</li> <li>• Trend: static</li> <li>• Extent: across the entire range</li> </ul>	<p>The salmonid species brown trout (<i>Salmo trutta</i>) and rainbow trout (<i>Oncorhynchus mykiss</i>) were first introduced to Australia in the 1800s for angling reasons. They were and continue to be, stocked into wild rivers and streams, many of which contain native galaxiid species, including roundsnout galaxias. Presently, most of the trout stocking in Victoria only occurs in lakes and impoundments, with only some minor stocking in wild rivers (VFA 2021a). However, wild populations of trout are now self-sustaining in catchments which contain roundsnout galaxias populations (Jarvis et al. 2019). For instance, the trout found in the East Gippsland catchment were most likely established from historic stocking (VFA 2021b). In NSW, trout stocking occurs annually in impoundments and wild rivers (NSW DPI 2021). For example, in 2019/20 over 2000 brown trout and 500 rainbow trout were stocked into a section (37°02'24.0"S 148°54'36.0"E) of the Delegate River, west of the town of Delegate, NSW (NSW DPI 2021).</p> <p>In Australia, trout have heavily impacted galaxiid species, including roundsnout galaxias, and it is considered that trout can impact all galaxias species at every stage of their life cycle through predation and competition (Cadwallader 1996; McDowall 2006; Raadik 2019a). The fragmented distribution of galaxiid species in Australia is directly related to the presence of</p>

Threat	Status	Evidence
		<p>trout, as simply galaxiids cannot persist alongside trout (Cadwallader 1996; Raadik 2019b). For instance, the presence of trout in the Cann River prevents roundsnout galaxias movement within the catchment (Vic TSA 2020), hence impeding any gene flow. Furthermore, the following papers: Frankenberg (1966; 1969) and Cadwallader (1979) (all cited in Cadwallader 1996) investigated the impacts of trout on the distribution of roundsnout galaxias' former taxon, mountain galaxias, and found that trout caused the fragmentation of mountain galaxias populations in Victoria and NSW, with the following conclusion—'<i>trout appeared to have fragmented their (mountain galaxias) range into a number of small, isolated populations</i>'.</p> <p>It is postulated that roundsnout galaxias may exhibit some predator-avoidance behaviour when located in areas with trout (Raadik 2011). This may include occupying shallow riffles (&lt;0.1 m in depth) inaccessible by trout (Raadik 2011). However, this has not yet been confirmed and the presence of trout means most roundsnout galaxias subpopulations exists as a single, isolated population (Raadik 2017, 2019b).</p> <p>Redfin (<i>Perca fluviatilis</i>) was introduced into Australia in the 1800s for angling reasons, and is now distributed in NSW, Victoria, Tasmania, South Australia, and Western Australia (Lake 1978; McDowall 1980; Allen et al. 2002; Humphries &amp; Walker 2013). In NSW, redfin occurs alongside roundsnout galaxias in the Bombala and Delegate rivers (D Gilligan 2021. pers comm 15 June).</p> <p>Redfin are suspected to have led to the local extirpations of many native freshwater fishes predominately through predation (Arthington &amp; McKenzie 1997; Wedderburn &amp; Barnes 2016). While interactions between redfin and roundsnout galaxias have not been documented, Redfin have directly impacted other galaxiid species via either predation or competition for resources: <i>Galaxias maculatus</i> (common galaxias), <i>Galaxiella pusilla</i> (dwarf galaxias), <i>G. munda</i> (western dwarf galaxias), <i>G. fontanus</i> (swan galaxias) and <i>G. occidentalis</i> (western galaxias) (Arthington &amp; McKenzie 1997; Rowe et al. 2008; Wedderburn et al. 2014; Wedderburn &amp; Barnes 2016).</p>
Climate change		
Extreme weather events	<ul style="list-style-type: none"> <li>• Timing: current/future</li> <li>• Confidence: suspected/known</li> <li>• Likelihood: almost certain</li> <li>• Consequence: catastrophic</li> <li>• Trend: increasing</li> <li>• Extent: across the entire range</li> </ul>	<p>Increased frequency of extreme events caused by climate change, such as bushfires, floods and drought can severely impact roundsnout galaxias populations (Raadik 2019a; Vic TSA 2020). These events can cause a decline in the quality of roundsnout galaxias habitat through loss or availability of water, changes in water quality, chemistry and temperatures, impacts associated with erosion, and ecosystem disturbance and loss of instream refuge habitats (Raadik 2019a, b).</p> <p>Roundsnout galaxias is particularly vulnerable to drought given its small and isolated distribution (Raadik 2019a). In Australia, a recognised form of drought is meteorological drought where actual precipitation is below the expected level for a period of time (Bond et al. 2008; Lake 2011). Meteorological drought desiccates water and vital habitats utilised by the species (Raadik 2019b). Meteorological drought can vary in intensity, duration,</p>

Threat	Status	Evidence
		<p>frequency, and spatial extent resulting in the localised extirpations of freshwater fishes, where recovery may take many years or never at all (Lake 2011; Lennox et al. 2019), which could potentially include roundsnout galaxias populations</p> <p>While climate change does not directly cause bushfire, it has caused an increase in the occurrence of extreme fire weather and in the length of the fire season across large parts of Australia since the 1950s (CSIRO 2020). In 2019, the annual national mean temperature was 1.52°C above average (BoM 2020). The highest annual accumulated Forest Fire Danger Index (FFDI) was recorded in 2019 (CSIRO 2020).</p> <p>Bushfires causes direct and indirect impacts on aquatic ecosystems (Lyon &amp; O'Connor 2008). Direct impacts include increases in water temperatures and changes to water chemistry. Increased input of nutrients from surrounding burnt vegetation in particular, nitrogen and phosphorus can also degrade water quality (Wilkinson et al. 2007; Lyon &amp; O'Connor 2008). As there is less canopy and ground vegetation cover following a fire event, the biggest indirect impact is post-fire rainfall leading to runoff of sediment, ash, and nutrients or 'sediment slugs' into waterways (Wilkinson et al. 2007; Lyon &amp; O'Connor 2008; Raadik 2016; Alexandra &amp; Finlayson 2020). Sediment slugs contain higher nutrient levels and may increase the chances of toxic algal blooms occurring which can lower oxygen levels, which if severe enough can lead fish kills (Wilkinson et al. 2007; Alexandra &amp; Finlayson 2020). Sediment slugs have been found to cause impacts to the aquatic ecosystem up to 80 km downstream of a fire impacted area (Lyon &amp; O'Connor 2008), where the increased sedimentation alters vital instream habitats and water flows required by fish for vital life history strategies such as migration, spawning or recruitment (Gresswell 1999; Dunham et al. 2007; Ayres et al. 2012; Raadik 2015; 2016). The sediments fill refuge pools, alters stream morphology and blankets streambed habitats, such as cobbles and pebbles, where galaxiids congregate (Ayres et al. 2012; Raadik 2015, 2016).</p> <p>In 2019/20, catastrophic bushfire conditions culminated in fires that covered an unusually large area of eastern and southern Australia. In many places, the fires burnt with high intensity. The full impact of the 2019/20 bushfires has yet to be fully determined. The bushfires will not have impacted all areas equally, some areas burnt at very high intensity while other areas burnt at lower intensity, potentially even leaving patches unburnt within the fire footprint.</p>
Habitat loss and modification		
Land clearing	<ul style="list-style-type: none"> <li>• Timing: historical/current</li> <li>• Confidence: known</li> <li>• Likelihood: possible</li> <li>• Consequence: moderate</li> <li>• Trend: unknown</li> <li>• Extent: across part of its range</li> </ul>	<p>Land clearing for agricultural grazing and forestry operations can result in the degradation and removal of stream habitat and vegetation utilised by roundsnout galaxias. Earthworks associated with these land use practices can include soil disturbance and removal or disturbance aquatic and overhanging vegetation. This can potentially lead to erosion, with increased sedimentation and, effluent runoff into waterways containing the species (Raadik 2019a; Vic TSA 2020). Rainfall can exacerbate sedimentation and effluent runoff as less canopy and ground</p>

Threat	Status	Evidence
		<p>vegetation cover is available to capture/intercept rain (Raadik 2016).</p> <p>Declines in water quality via land clearing can have the similar impacts as that of bushfires (see previous threat).</p>
River regulation	<ul style="list-style-type: none"> <li>• Timing: historic/current/future</li> <li>• Confidence: known</li> <li>• Likelihood: likely</li> <li>• Consequence: major</li> <li>• Trend: unknown</li> <li>• Extent: across parts of its range</li> </ul>	<p>River regulation diverting or restricting natural river flows can cause detrimental effects on freshwater fish populations (Gehrke et al. 1999; Humphries &amp; Lake 2000). These regulations alter natural river flows, changes in downstream water temperatures, salinity and habitats, riverbank erosion and, create instream barriers restricting fish movement, potentially leading to the fragmentation of fish populations (Charikar 1999; Humphries &amp; Lake 2000).</p> <p>River regulations in the Snowy River catchment for hydroelectricity and irrigation have directly impacted fish abundance while indirect effects include changes to food webs through a decline in the number of insects which many fish prey upon and the incidental translocation of introduced and non-native species into new waterbodies which have been detrimental to native fish populations (Bergmann 1999; Lintermans 2004; Bond et al. 2008; Fulton &amp; Hall 2011).</p> <p>While historic and current river regulations in the Snowy River catchment would have affected roundsnout galaxias populations (including its former taxon, mountain galaxias), future populations may potentially be affected by the Snowy Hydro 2.0 even though the species doesn't occur in the 'main works' area of the proposed infrastructure project (Cardno 2019). Nevertheless, the species distribution in the lower Snowy River catchment may still be impacted from altered river flow.</p>
Diseases and parasites		
	<ul style="list-style-type: none"> <li>• Timing: historical/current</li> <li>• Confidence: known</li> <li>• Likelihood: unlikely</li> <li>• Consequence: minor</li> <li>• Trend: unknown</li> <li>• Extent: unknown</li> </ul>	<p>Juvenile roundsnout galaxias from the Gnoa River have been found to be heavily infested with trematode cysts (potentially digenean) (Raadik 2014). Fish are generally an intermediate host for parasites and while some fish can be heavily infected, many co-exists without any or only minor increases in mortality or changes in behaviour (Collyer &amp; Stockwell 2004). However, infection with trematode metacercariae in two <i>Galaxiella</i> species (<i>G. pusilla</i>, dwarf galaxias and <i>G. toourtkoourt</i>, little galaxias) increased the likelihood of predation due to altered fish behaviour and/or morphology (Coleman &amp; Hoffmann 2016).</p> <p>Roundsnout galaxias have been observed infected with anchor worm (<i>Lernaea cyprinacea</i>) (Raadik 2014). While the parasite does not cause direct mortality to the host, an infestation can cause indirect mortality through poor health and growth as it negatively impacts the feeding behaviour of its host (Read et al. 2007). Anchor worms are thought to have been introduced through European carp and redfin (Lintermans 2007; Diggles 2011; Humphries &amp; Walker 2013).</p> <p>Epizootic haematopoietic necrosis virus (EHNV) is an Australian endemic iridovirus (<i>Ranavirus</i>) affecting many native and introduced freshwater fish (OIE 2018). While roundsnout galaxias has not been observed as naturally susceptible to EHNV, its former overarching taxon mountain galaxias is highly</p>

Threat	Status	Evidence
		susceptible (OIE 2018). However, the susceptibility to EHNIV does not correlate with taxonomic relatedness (Becker et al. 2019), and it is unknown whether roundsnout galaxias will be susceptible to the virus. Furthermore, it now appears that the virus is endemic in the upper Murrumbidgee River catchment, in the Murray-Darling (Becker et al. 2019; Kaminskas 2020), and unlikely to impact roundsnout galaxias. Although EHNIV has not been detected (last detected in Victoria) since 2012, transmission outside the virus' range is possible through vectors such as susceptible host carriers (rainbow trout and redfin), from birds (on their feathers, feet, and the bill), and through recreational fisher-assisted translocations (Rowe et al. 2008; OIE 2018; AHA 2021).

Timing—identifies the temporal nature of the threat:

Confidence—identifies the nature of the evidence about the impact of the threat on the species

Likelihood—identifies the likelihood of the threat impacting on the whole population or extent of the species

Consequence—identifies the severity of the threat

Trend—identifies the extent to which it will continue to operate on the species

Extent—identifies its spatial context in terms of the range of the species

Each threat has been described in Table 1 in terms of the extent that it is operating on the species. The risk matrix (Table 2) provides a visual depiction of the level of risk being imposed by a threat and supports the prioritisation of subsequent management and conservation actions. In preparing a risk matrix, several factors have been taken into consideration, they are: the life stage they affect; the duration of the impact; and the efficacy of current management regimes, assuming that management will continue to be applied appropriately. The risk matrix and ranking of threats has been developed in consultation with in-house expertise using available literature.

**Table 2:** Roundsnout galaxias risk matrix depicting threats listed in Table 1.

Likelihood	Consequences				
	Not significant	Minor	Moderate	Major	Catastrophic
Almost certain					Increased predation and competition.  Extreme weather events.
Likely				River regulation.	
Possible			Land clearing.		
Unlikely		Diseases and parasites			
Unknown					

Risk Matrix legend/Risk rating:

Low Risk	Moderate Risk	High Risk	Very High Risk
----------	---------------	-----------	----------------

**Categories for likelihood are defined as follows:**

Almost certain – expected to occur every year

Likely – expected to occur at least once every five years

Possible – might occur at some time

Unlikely – known to have occurred only a few times

Unknown – currently unknown how often the threat will occur

**Categories for consequences are defined as follows:**

Not significant – no long-term effect on individuals or populations

Minor – individuals are adversely affected but no effect at population level



Moderate – population recovery stable or declining

Major – population decline is ongoing

Catastrophic – population trajectory close to extinction

Priority actions have then been developed to manage the threats, particularly where the risk was deemed to be ‘very high’ (red shading) or ‘high’ (orange shading). For those threats with an unknown or low risk (blue and green shading respectively) research and monitoring actions have been developed to understand and evaluate the impact of the threats, where appropriate.

## Conservation and recovery actions

### Primary conservation outcome

The primary conservation action is to mitigate probability of extinction of roundsnout galaxias in the wild, through removal of the species’ main threat of predation risk from introduced fish predators as well as improving lost or degraded habitats so that populations can become self-sustaining.

### Conservation and management priorities

#### Invasive species (including threats from predation)

- Remove and control introduced fish species in roundsnout galaxias catchment(s); and prevent any further introductions of non-native fish species into roundsnout galaxias catchment(s).
- Construct or modify, and maintain, instream barriers, where appropriate to prevent the access of introduced and non-native fish species.

#### Habitat loss disturbance and modifications

- Maintain vegetated protection zones (no harvesting or soil disturbance) along the entire stream drainage network (wet or dry, stream channel to headwater drainage lines), within catchment(s) where the species occurs.
- Create temporary, artificial, deep ‘refuge’ pools (particularly immediately downstream of groundwater inflow areas) to provide temporary security from complete population loss in the event of a sudden but short-term loss of surface water, allowing for salvage of surviving fish (and to facilitate movement into more suitable habitat). In some areas, artificial spawning structures may also be required to bolster natural spawning following sedimentation events.

#### Captive breeding

- Investigate techniques for ex-situ captive maintenance, breeding on-growing and translocation. This action can adhere to the techniques (and supplementary material) identified in the NSW Department of Primary Industries Fisheries report, *Conservation translocation handbook for New South Wales threatened small-bodied freshwater fishes* where techniques for ex-situ maintenance and production on multiple galaxiid species can be applied for roundsnout galaxias. This will support translocations when wild-to-wild translocations may be limited by lack of individuals.

#### Genetic diversity

- Undertake analysis of population genetic diversity to guide captive breeding, translocations, and also success of translocations.

### **Translocation and other ex-situ recovery action**

- Prepare translocation or salvage/rescue plans in response to future climatic-induced events such as fire, flooding and drought or from anthropogenic-induced habitat destruction/modification. Such plans must include:
  - Triggers for immediate intervention or foresight for at-risk populations.
  - Identifying and evaluating potential translocation sites. This includes the re-introduction into sites which had previous roundsnout galaxias populations but were lost/affected by climatic events.
- Translocate into areas that are known to be free of introduced fish species. These may be new catchment(s) with suitable roundsnout galaxias habitat (assisted colonisation), re-introduction into areas where introduced fish species have been removed (re-introduction), or to existing populations for genetic management (reinforcement).
- Annually monitor establishment success of translocated populations, including genetic analysis and undertake genetic top-ups when required, and evaluate success following three generations (approximately 9 years).

### **Stakeholder engagement/community engagement**

- Liaise with government agencies and stakeholders to ensure information on roundsnout galaxias populations and threat identification and management is conveyed to land/water managers and included in relevant management processes—in particular, National Resource Management planning processes.
- Ensure that all stocking programs considers the potential impact to roundsnout galaxias. Waterways (or a section of a waterway if barriers exist to prevent movement of fish) will not be stocked where there is reasonable evidence the released fish species may constitute an unacceptable risk to roundsnout galaxias.
- Engage and involve Traditional Owners in conservation actions, including the implementation of Indigenous fire management and other survey, monitoring and management actions.
- Promote community awareness of, and identify opportunities for, involvement in the conservation of roundsnout galaxias.

### **Survey and monitoring priorities**

- Undertake detailed, long-term monitoring to determine population trends (naturally occurring and translocated), and as early warning of predator incursion, this can include the use of environmental DNA (eDNA) survey methods (if robust methods have been developed).
- Undertake annual monitoring of habitat condition and degradation and monitor and evaluate the efficacy of management interventions.
- Undertake targeted surveys in suitable and potential habitat to locate any additional subpopulations and identify suitable translocation sites.

## Information and research priorities

- Undertake data-gap surveys and acquire baseline data for newly discovered populations.
- Investigate low dissolved oxygen tolerance of adults, juveniles, larvae, and eggs. This is particularly in response to post-fire impacts from 'sediment slugs'.
- Investigate water temperature tolerances of adults, juveniles, larvae, and eggs. This is particularly in response to increasing impacts from climate change and will determine the ability of fish to survive increasing temperatures, or translocation to warmer catchments.
- Investigate movement and dispersal patterns of adults and juveniles. This will provide additional information on key aspects of the species biology to aid management of roundsnout galaxias populations.
- Investigate roundsnout galaxias predator-avoidance behaviour, where both species co-exist as well as investigate if the presence of introduced predators' limits roundsnout galaxias movement within and between known populations.
- Investigate life history traits, such as time of sexual maturity, longevity, fecundity, spawning period and recruitment.
- Investigate diet and habitat preferences, including habitats that are identified as 'critical to survival'.
- Ascertain the cultural significance of the roundsnout galaxias to Traditional Owners.
- Investigate roundsnout galaxias susceptibility to diseases and parasites that are endemic to areas that contain known populations.

## Links to relevant implementation documents

Raadik TA, Fairbrother PS & Smith SJ (2010). *National Recovery Plan for the Barred Galaxias Galaxias Fuscus*. Department of Sustainability and Environment, Melbourne, Australia.

Raadik TA (2015). *Barred Galaxias Galaxias fuscus. Flora and Fauna Guarantee Act 1988 Action Statement No. 65*. Department of Environment, Land, Water and Planning, Victoria, Australia.

Zukowski S, Whiterod N, Ellis I, Gilligan D, Kerezszy A, Lamin C, Lintermans M, Mueller S, Raadik TA & Stoessel D (2021). *Conservation translocation handbook for New South Wales threatened small-bodied freshwater fishes. A report to the New South Wales Department of Primary Industries Fisheries*. Aquasave–Nature Glenelg Trust, Victor Harbor, South Australia, Australia.

## Conservation Advice and Listing Assessment references

ABRS (Australian Biological Resources Study) (2020). Species *Galaxias terenassus* Raadik, 2014. Viewed 30 November 2020. Available at: [https://biodiversity.org.au/afd/taxa/Galaxias\\_terenassus](https://biodiversity.org.au/afd/taxa/Galaxias_terenassus)

AHA (Animal Health Australia) (2021). *Animal Health in Australia Annual Report 2019–2020*. Animal Health Australia, Canberra, Australia.

Allen GR, Midgley SH & Allen M (2002). Galaxiids Family *Galaxiidae*, in Allen GR, Midgley SH & Allen M (eds), *Field Guide to the Freshwater Fishes of Australia*. Western Australian Museum, Perth, Australia. pp. 94–116.

Alexandra J & Finlayson M (2020). Floods after bushfires: rapid responses for reducing impacts of sediment, ash, and nutrient slugs. *Australasian Journal of Water Resources*. DOI: 10.1080/13241583.2020.1717694

Arthington A & McKenzie F (1997). *Review of impacts of displaced/introduced fauna associated with inland waters*. Australia: State of the Environment Technical Paper Series (Inland Waters), Department of the Environment, Canberra, Australia.

Ayres RM, Nicol MD & Raadik TA (2012). *Establishing new populations for fire-affected Barred Galaxias (Galaxias fuscus): site selection, trial translocation and population genetics*. *Black Saturday Victoria 2009 – Natural values fire recovery program*. Department of Sustainability and Environment, Heidelberg, Victoria, Australia.

Becker JA, Gilligan D, Asmus M, Tweedie A & Whittington RJ (2019). Geographic distribution of epizootic haematopoietic necrosis virus (EHNV) in freshwater fish in southeastern Australia: Lost opportunity for a notifiable pathogen to expand its geographic range. *Viruses* 11, 4, 315. doi:10.3390/v11040315

BoM (Bureau of Meteorology) (2020). *Annual climate statement 2019*. Viewed 3 December 2020. Available on the Internet at: <http://www.bom.gov.au/climate/current/annual/aus/>

Bond NR, Lake PS & Arthington AH (2008) The impacts of drought on freshwater ecosystems: an Australian perspective. *Hydrobiologia* 600, 3–16.

- Cadwallader PL (1996). *Overview of the Impacts of Introduced Salmonids on Australian Native Fauna*. Report prepared for the Australian Nature Conservation Agency, Canberra Australia.
- Cardno (2019) Aquatic Ecology Assessment Snowy 2.0 Main Works. Available on the internet at: <https://emmdigital.com.au/Snowy2.0MainWorksSummary/downloads/Appendix-M.2-Aquatic-ecology-assessment.pdf>
- CSIRO (Commonwealth Scientific and Industrial Research Organisation) (2020). *The 2019-20 bushfires: a CSIRO explainer*. February 2020. Viewed: 3 December 2020. Available on the Internet at: <https://www.csiro.au/en/Research/Environment/Extreme-Events/Bushfire/preparing-for-climate-change/2019-20-bushfires-explainer>
- Coleman RA & Hoffmann AA (2016). Digenean trematode cysts within the heads of threatened *Galaxiella* species (Teleostei: Galaxiidae) from south-eastern Australia. *Australian Journal of Zoology* 64, 285–291.
- Collyer ML & Stockwell CA (2004). Experimental evidence for costs of parasitism for a threatened species, White Sands pupfish (*Cyprinodon tularosa*). *Journal of Animal Ecology* 73, 821–830.
- Diggles B (2011). Risk Analysis – *Aquatic Animal Diseases Associated with Domestic Bait Translocation*. DigsFish Services Pty Ltd, FRDC project no. 2009/072, Banksia Beach, Australia.
- Dunham JB, Rosenberger AE, Luce Ch & Rieman BE (2007). Influences of wildfire and channel reorganization on spatial and temporal variation in stream temperature and the distribution of fish and amphibians. *Ecosystems* 10, 335–346.
- FoA (Fishes of Australia) (2020). Roundsnout galaxias, *Galaxias terenassus* Raadik 2014. Viewed 1 December 2020. Available at: <https://fishesofaustralia.net.au/home/species/5132#classification>
- Fulton W & Hall K (eds) (2011). *Freshwater fish resources in the Snowy River, Victoria*. Fisheries Victoria Research Report Series No. 25, Victorian Department of Primary Industries, Australia.
- GBIF (Global Biodiversity Information Facility) (2021) *Galaxias terenassus* Raadik, 2014. Viewed 12 January 2021. Available at: <https://www.gbif.org/species/9101803>
- Gehrke PC, Astles KL & Harris JH (1999) Within-catchment effects of flow alteration on fish assemblages in the Hawkesbury-Nepean River system, Australia. *Regulated Rivers: Research and Management* 15, 181–198.
- Gresswell RE (1999). Fire and aquatic ecosystems in forested biomes of North America. *Transactions of the American Fisheries Society* 128, 193–221.
- Humphries P & Lake PS (2000) Fish larvae and the management of regulated rivers. *Regulated Rivers: Research and Management* 16, 421–432.

- Humphries P & Walker K (Eds) (2013). *Ecology of Australian Freshwater Fishes*. CSIRO Publishing, Victoria, Australia.
- Kaminskas S (2020). Alien pathogens and parasites impacting native freshwater fish of southern Australia: a scientific and historical review. *Australian Zoologist*. 10.7882/AZ.2020.039.
- Kuiter RH (2018) *Victoria's Galaxiid Fishes Second Edition*. Aquatic Photographics, Victoria, Australia pp.104.
- Lake JS (1978). *Australian Freshwater Fishes An Illustrated Field Guide*. Thomas Nelson Australia, Victoria, Australia.
- Lake PS (2011). *Drought and Aquatic Ecosystems: Effects and Responses*. Wiley-Blackwell. West Sussex, United Kingdom.
- Legge S, Woinarski J, Garnett S, Nimmo D, Scheele B, Lintermans M, Mitchell N, Whiterod N and Ferris J (2020). Revised provisional list of animals requiring urgent management intervention. Australian Government Department of Agriculture, Water and the Environment, Canberra. Viewed 12 February 2021. Available at: <http://www.environment.gov.au/biodiversity/bushfire-recovery/priority-animals>
- Lennox RJ, Crook DA, Moyle PB, Struthers DP & Cooke SJ (2019). Toward a better understanding of freshwater fish responses to an increasingly drought-stricken world. *Reviews in Fish Biology and Fisheries* 29, 71–92.
- Lintermans M (2004) Human-assisted dispersal of alien freshwater fish in Australia. *New Zealand Journal of Marine and Freshwater Research* 38, 481–501.
- Lintermans M (2007). *Fishes of the Murray-Darling Basin: An introductory guide*. Murray-Darling Basin Authority, Canberra, Australia.
- Lyon JP & O'Connor JP (2008) Smoke on the water: Can riverine fish populations recover following a catastrophic fire-related sediment slug? *Austral Ecology* 33, 794–806.
- McDowall RM (1980). Chapter 30 Family Percidae – Freshwater perches, in McDowall RM (ed) *Freshwater Fishes of South-Eastern Australia*. Reed Books, Sydney, New South Wales, Australia. pp. 183–185.
- McDowall RM (2006) Crying wolf, crying foul, or crying shame: alien salmonids and a biodiversity crisis in the southern cool-temperate galaxioid fishes? *Reviews in Fish Biology and Fisheries* 16, 233–422.
- McDowall RM & Frankenberg RS (1981) The galaxiid fishes of Australia (Pisces: *Galaxiidae*). *Records of the Australian Museum* 33, 10, 443–605.
- McDowall RM & Fulton W (1996). Chapter 10 Family Galaxiidae – Galaxiids, in McDowall RM (ed) *Freshwater Fishes of South-Eastern Australia*. Reed Books, Sydney, New South Wales, Australia. pp. 52– 77.
- Merrick JR & Schmida GE (1984). *Galaxias*, in Merrick JR & Schmida GE (eds) *Australian Freshwater Fishes*. Macquarie University, New South Wales, Australia.

- MV (Museums Victoria) (2021) *Galaxias terenassus* Raadik, 2014. Viewed 12 January 2021.  
Available at:  
<https://collections.museumsvictoria.com.au/search?taxon=Galaxias+terenassus&sort=date&view=data>
- NSW DPI (Department of Primary Industries) (2021) *Fish stocking*. Viewed 26 March 2021.  
Available at: <https://www.dpi.nsw.gov.au/fishing/recreational/resources/stocking>
- OIE (World Organisation for Animal Health) (2018). Chapter 2.3.1. Infection with Epizootic Haematopoietic Necrosis Virus. Viewed: 29 June 2021. Available on the Internet at:  
[https://www.oie.int/fileadmin/Home/eng/Health\\_standards/aahm/current/chapitre\\_ehn.pdf](https://www.oie.int/fileadmin/Home/eng/Health_standards/aahm/current/chapitre_ehn.pdf)
- Raadik TA (2011) *Systematic Revision of the Mountain Galaxias, Galaxias olidus Günther, 1866 Species Complex (Teleostei: Galaxiidae) in Eastern Australia*. Doctoral dissertation, University of Canberra, Australian Capital Territory, Australia. pp. 520.
- Raadik TA (2014) Fifteen from one: a revision of the *Galaxias olidus* Günther, 1866 complex (Teleostei, *Galaxiidae*) in south-eastern Australia recognises three previously described taxa and describes 12 new species. *Zootaxa* 3898, 1–198.
- Raadik TA (2016). *Galaxias species complex in eastern Victoria (east of the Hume Highway) – information and advice to the Forest Industry Taskforce*. Unpublished client report. Arthur Rylah Institute for Environmental Research, Department of Environment, Land, Water and Planning, Heidelberg, Victoria, Australia.
- Raadik TA (2017). *Predator control options for threatened galaxiids in small, upland Victorian streams: a discussion paper*. Unpublished Client report for Biodiversity Branch, EECC Division, Department of Environment, Land, Water and Planning. Arthur Rylah Institute for Environmental Research, DELWP, Heidelberg, Victoria, Australia.
- Raadik TA (2019a). *Galaxias terenassus*. *The IUCN Red List of Threatened Species 2019*. Viewed 1 December 2020. Available at:  
<https://www.iucnredlist.org/species/122903260/123382166>
- Raadik TA (2019b). *Conservation of endemic and threatened Victorian galaxiid species*. Victorian Department of Environment, Land, Water and Planning, Victoria, Australia.
- Raadik TA, Fairbrother PS & Smith SJ (2010). *National Recovery Plan for the Barred Galaxias fuscus*. Department of Sustainability and Environment, Melbourne, Australia.
- Read P, Landos M, Rowland SJ & Mifsud C (2007). *Diagnosis, Treatment & Prevention of the Diseases of the Australian Freshwater Fish Silver Perch (Bidyanus bidyanus)*. NSW Department of Primary Industries, Sydney, Australia.
- Rowe D, Moore A, Giorgetti A, Maclean C, Grace P, Wadhwa S & Cooke J (2008). *Review of the impacts of gambusia, redfin perch, tench, roach, yellowfin goby and streaked goby in Australia*. Prepared for the Australian Government Department of the Environment, Water, Heritage and the Arts, Canberra, Australia.



- Shelley JJ, Raadik TA & Lintermans M (2021). *DRAFT Summary of the 2019/20 bushfire impacts on freshwater fish and the emergency conservation responses in south-eastern Australia. NESP TSR Hub Project 8.3.6*. Arthur Rylah Institute for Environmental Research Technical Report Series No. XXX. Department of Environment, Land, Water and Planning, Victoria, Australia.
- Vic DELWP (Department of Environment, Land, Water and Planning) (2020) *Victoria's bushfire emergency: biodiversity response and recovery Version 2 August 2020*. Victorian Department of Environment, Land, Water and Planning, Victoria, Australia.
- Vic TSA (Threatened Species Assessment) (2020) *Galaxias terenassus Roundsnout Galaxias*. Victorian Department of Environment, Land, Water and Planning, Victoria, Australia.
- VFA (Victorian Fisheries Authority) (2021a) *Managing Recreational Trout Fisheries*. Viewed 26 March 2021. Available at: <https://vfa.vic.gov.au/recreational-fishing/fish-stocking/managing-recreational-trout-fisheries>
- VFA (Victorian Fisheries Authority) (2021b) *East Gippsland – Angling Waters*. Viewed 27 May 2021. Available at: <https://vfa.vic.gov.au/recreational-fishing/fishing-locations/inland-angling-guide/areas/east-gippsland/east-gippsland-angling-waters#wallagaraugh>
- Wedderburn SD, Bice CM & Barnes TC (2014) Prey selection and diet overlap of native golden perch and alien redfin perch under contrasting hydrological conditions. *Australian Journal of Zoology* 62, 374–381.
- Wedderburn SD & Barnes TC (2016) Piscivory by alien redfin perch (*Perca fluviatilis*) begins earlier than anticipated in two contrasting habitats of Lake Alexandrina, South Australia. *Australian Journal of Zoology* 64, 1–7.
- Wilkinson S, Wallbrink P, Shakesby R, Blake W & Doerr S (2007) Impacts on water quality by sediments and nutrients released during extreme bushfires: Summary of findings. Available on the internet at: <https://publications.csiro.au/rpr/download?pid=procite:2e75ecb5-f52f-4ae7-b7e7-d69a222348ed&dsid=DS1>

### **Other sources**

- Bergmann M (1999). The Snowy Mountains Hydro-electric Scheme: How did it Manage Without an EIA? Available on the internet at: [https://openresearch-repository.anu.edu.au/bitstream/1885/41879/1/dp\\_60.html](https://openresearch-repository.anu.edu.au/bitstream/1885/41879/1/dp_60.html)
- Charikar K (1999). Last Chance for the Snowy. Environment Victoria.
- Gilligan D (2021). Personal communication by email, 15 June 2021. NSW Department of Primary Industries, Fisheries.
- Legge S (2021). Personal communication by email, 25 February 2021. Threatened Species Scientific Committee.
- NSW DPI (Department of Primary Industries) (2021). Fisheries Aquatic Ecosystems Research database.



Raadik TA (2021). Personal communication by email, 8 July 2021. Arthur Rylah Institute for Environmental Research, Heidelberg, Victoria, Australia.

DRAFT

## Attachment A: Listing Assessment for *Galaxias terenassus*

### Reason for assessment

This assessment follows prioritisation of a nomination from the Threatened Species Scientific Committee. The nomination relates to the National Environment Science Programme (NESP) Threatened Species Recovery hub project 8.3.2, *Effect of fire severity on the response of populations of priority wildlife species* in response to the 2019/20 bushfire event in south-eastern Australia, identifying species that required immediate assessment and management intervention, based on how imperilled they were before the fire, the extent to which their distribution was burnt, and how sensitive the species is to fire.

### Assessment of eligibility for listing

This assessment uses the criteria set out in the [EPBC Regulations](#). The thresholds used correspond with those in the [IUCN Red List criteria](#) except where noted in criterion 4, sub-criterion D2. The IUCN criteria are used by Australian jurisdictions to achieve consistent listing assessments through the Common Assessment Method (CAM).

### Key assessment parameters

Table 3 includes the key assessment parameters used in the assessment of eligibility for listing against the criteria. The definition of each of the parameters follows the [Guidelines for Using the IUCN Red List Categories and Criteria](#).

**Table 3:** Key assessment parameters used for assessment of roundsnout galaxias against the criteria.

Metric	Estimate used in the assessment	Minimum plausible value	Maximum plausible value	Justification
Number of mature individuals	N/A	2500		An estimate of the number of mature individuals is not available for the national extent and the minimum plausible value for the species could be 2500 individuals (see <i>Criterion 1</i> ).
Trend	Stable or increasing			
Generation time (years)	N/A	1	3	The maximum life expectancy for roundsnout galaxias has not been measured and is estimated from its former overarching taxon, mountain galaxias, which is between 1–3 years (see <i>Criterion 1</i> ).
Extent of Occurrence	4722 km <sup>2</sup>			This estimate is derived from observation data for 2011 from the following repositories: SPRAT, ALA, NSW BioNet Atlas, the Victorian Biodiversity Atlas; as well as the IUCN Redlist of Threatened Species assessment of Roundsnout Galaxias (published 2019), and research surveys from Tarmo (2014) and the NSW DPI – Fisheries AERD (see <i>Criterion 2</i> ).
Trend	Decreasing or stable			May have contracted following 2019/20 bushfires in NSW and Victoria.
Area of Occupancy	60 km <sup>2</sup>			See Extent of Occurrence justification.

Metric	Estimate used in the assessment	Minimum plausible value	Maximum plausible value	Justification
AOO is a standardised spatial measure of the risk of extinction, that represents the area of suitable habitat known, inferred or projected to be currently occupied by the taxon. It is estimated using a 2 x 2 km grid to enable comparison with the criteria thresholds. The resolution (grid size) that maximizes the correlation between AOO and extinction risk is determined more by the spatial scale of threats than by the spatial scale at which AOO is estimated or shape of the taxon's distribution. It is not a fine-scale estimate of the actual area occupied. In some cases, AOO is the smallest area essential at any stage to the survival of existing populations of a taxon (e.g. breeding sites for migratory species).				
Trend	Stable			See Extent of Occurrence trend.
Number of subpopulations	N/A	3	4	The number of subpopulations has been determined by the species distribution in rivers in the Snowy River and East Gippsland catchments (see <i>Distribution</i> and <i>Criterion 2</i> ).
Trend	N/A			
Basis of assessment of subpopulation number	See number of subpopulations justification.			
No. locations	1	1	1	The number of locations has been determined by ongoing and recent extreme weather events caused by climate change which can potentially affect the species entire distribution range (see <i>Criterion 2</i> ).
Trend	N/A			
Basis of assessment of location number	The number of locations for roundsnout galaxias across its national extent is estimated to be equal to one, determined by the species distribution in NSW and Victoria, and potential threats to this distribution (see <i>Distribution</i> and <i>Criterion 2</i> ).			
Fragmentation	The species' distribution is fragmented in the Cann River by the presence of trout.			
Fluctuations	Not subject to extreme fluctuations in EOO, AOO, number of subpopulations, locations, or mature individuals.			

As mentioned previously (see *Taxonomy*), for the purposes of this assessment, the Cann River population will be included as *Galaxias terenassus*.

### Criterion 1 Population size reduction

Reduction in total numbers (measured over the longer of 10 years or 3 generations) based on any of A1 to A4			
	Critically Endangered Very severe reduction	Endangered Severe reduction	Vulnerable Substantial reduction
A1	≥ 90%	≥ 70%	≥ 50%
A2, A3, A4	≥ 80%	≥ 50%	≥ 30%
<p><b>A1</b> Population reduction observed, estimated, inferred or suspected in the past and the causes of the reduction are clearly reversible AND understood AND ceased.</p> <p><b>A2</b> Population reduction observed, estimated, inferred or suspected in the past where the causes of the reduction may not have ceased OR may not be understood OR may not be reversible.</p> <p><b>A3</b> Population reduction, projected or suspected to be met in the future (up to a maximum of 100 years) [(a) <i>cannot be used for A3</i>]</p> <p><b>A4</b> An observed, estimated, inferred, projected or suspected population reduction where the time period must include both the past and the future (up to a max. of 100 years in future), and where the causes of reduction may not have ceased OR may not be understood OR may not be reversible.</p> <p>Based on any of the following</p> <ul style="list-style-type: none"> <li>(a) direct observation [except A3]</li> <li>(b) an index of abundance appropriate to the taxon</li> <li>(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat</li> <li>(d) actual or potential levels of exploitation</li> <li>(e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites</li> </ul>			

### Criterion 1 evidence

#### Not eligible

The maximum life expectancy for roundsnout galaxias has not been measured and is estimated from its former overarching taxon, mountain galaxias, which is between 3–4 years. Assessment for reduction in population size under this criterion is measured over the longer of 10 years or 3-generations, which for this species is 9–12 years (Allen et al. 2002; Vic TSA 2020). As described under *relevant biology and ecology*, given similarities to mountain galaxias all individuals are sexually mature at age class 1+ and by age class 3+ all individuals will only be female (McDowall & Fulton 1996). Therefore, a plausible estimate to measure the 1-generation interval reflecting the number of breeding individuals in a current population is between 1–3 years of age. As this results in the 3-generations to be less than 10 years, assessment under this criterion is between 2011–2020.

Roundsnout galaxias is only known from the Snowy and East Gippsland river catchments located in both NSW and Victoria in the south-eastern corner of the Australian continent (Raadik 2011; 2014; 2019a). Within these catchments they have been recorded in the following rivers: Snowy, Maclaughlin, Delegate/Bombala, Genoa and Cann (Raadik 2011; 2014; 2019a; Vic TSA 2020; NSW DPI Aquatic Ecosystems Research database).

Since 2011, only seven roundsnout galaxias have been detected in the Genoa River compared to 240 individuals detected in the tributaries of the Cann River (GBIF 2021; MV 2021; VBA 2021). Within these Cann River detections, 100 occurred in Buldah Creek in 2013 and 104 in Back Creek between 2016–20 (VBA 2021). Since 2013, no detections from Buldah Creek are due

to trout predation between 2015–17, as historically that tributary contained the second largest known subpopulation of roundsnout galaxias (Raadik 2017; Vic TSA 2020). Following the 2019/20 bushfires in south-east Australia, emergency rescues in the Cann River translocated 25 individuals from the wild into an aquarium holding facility, before being returned at their site of capture (Shelley et al. 2021).

In NSW, the majority of sampling for roundsnout galaxias occurred between 2011–15 (D Gilligan 2021. pers comm 15 June). 762 individuals surveyed and over 100 observations have been detected from the following rivers and creeks: Delegate, Snowy, MacLaughlin, Genoa and Cambalong (D Gilligan 2021. pers comm 15 June).

A 2018 aquatic ecology assessment for the hydro-electric project 'Snowy 2.0' main works' impact on the local aquatic environment was unable to detect any roundsnout galaxias in the Snowy River catchment (Cardno 2019). This is not unexpected as the survey only occurred in the upper-Snowy River catchment where historically, the species is absent, most likely because of the presence of introduced trout (see *Distribution*).

Assessment of decline over the past 10 years covers the period when roundsnout galaxias was taxonomically described as a separate species in 2014 (Raadik 2014). Prior to this, the species was considered as *Galaxias olidus* (mountain galaxias) which has a broad distribution across the east and south of Australia (McDowall & Frankenberg 1981; Raadik 2011; 2014). Genetic analysis of preserved specimens sampled prior to its description has revealed that a total of 108 roundsnout galaxias were sampled between 2002–11 in NSW and Victoria (MV 2021).

When comparing the number of detections for the 10-year period before the current assessment period (i.e., 2002–11 vs 2011–20), there is an indication for a potential increase in the population of roundsnout galaxias—108 individuals between 2002–11 and greater than 1000 individuals between 2011–20. However, the majority of those detections occurred in the NSW subpopulation and may not reflect the species national population. Furthermore, surveying for the species across NSW and Victoria has not been undertaken every year for the entire assessment period. Whilst all the detections in NSW have followed the same survey protocol, with data standardised to account for the varying levels of effort across survey years, surveys were only undertaken until 2015 and there have been no surveys since (D Gilligan 2021. pers comm 15 June; 7 September). In Victoria, the species has been detected in surveys every year between 2016–2020, including the rescue operations following the 2019/20 bushfires. Collectively, this data could indicate that the abundance of roundsnout galaxias population across its national extent is stable or increasing, however, as surveys were not consistent across years, this increase in detections is insufficient to determine a population trend for the species.

Following assessment of the data the Committee has determined that the species is not eligible for listing in any category under this criterion as the past, current or future population declines are thought unlikely to exceed 30% over the past 10 years. However, the purpose of this consultation document is to elicit additional information to better understand the species' status. This conclusion should therefore be considered tentative at this stage, as it may be changed as a result of responses to this consultation process.

## Criterion 2 Geographic distribution as indicators for either extent of occurrence AND/OR area of occupancy

	Critically Endangered Very restricted	Endangered Restricted	Vulnerable Limited
<b>B1.</b> Extent of occurrence (EOO)	< 100 km <sup>2</sup>	< 5,000 km <sup>2</sup>	< 20,000 km <sup>2</sup>
<b>B2.</b> Area of occupancy (AOO)	< 10 km <sup>2</sup>	< 500 km <sup>2</sup>	< 2,000 km <sup>2</sup>
<b>AND at least 2 of the following 3 conditions:</b>			
(a) Severely fragmented OR Number of locations	= 1	≤ 5	≤ 10
(b) Continuing decline observed, estimated, inferred or projected in any of: (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: (i) extent of occurrence; (ii) area of occupancy; (iii) number of locations or subpopulations; (iv) number of mature individuals			

### Criterion 2 evidence

#### Eligible under Criterion 2 B1ab(iii,iv)+B2ab(iii,iv) for listing as Endangered

The geographic distribution for roundsnout galaxias estimates extent of occurrence (EOO) at 4722 km<sup>2</sup> and area of occupancy (AOO) at 60 km<sup>2</sup>. These estimates are derived from observation data for 2011 from the following repositories: Species Profile and Threats Database (SPRAT), Atlas of Living Australia (ALA), NSW BioNet Atlas, the Victorian Biodiversity Atlas; as well as the International Union for Conservation of Nature and Natural Resources (IUCN) Redlist of Threatened Species assessment of Roundsnout Galaxias (published 2019), and research surveys from Raadik (2014) and the NSW Department of Primary Industries – Fisheries Aquatic Ecosystems Research database (AERD). The EOO was calculated using a minimum convex hull while AOO was calculated by using the 2x2 km grid cell method (based on the *Guidelines for using the IUCN Red List Categories and Criteria ver. 15*).

In NSW, roundsnout galaxias is present in the Snowy, Maclaughlin, Delegate/Bombala and upper Genoa rivers. The Genoa River is a separate subpopulation to the species' other distribution in NSW as the remaining rivers (Snowy, Maclaughlin, Delegate/Bombala) are part of one interconnected Snowy River catchment allowing for the species to freely move within (D Gilligan 2021. pers comm 15 June). In Victoria, the species is found in the Genoa and Cann rivers. The Genoa River is estimated to represent one subpopulation, while the subpopulation in the Cann River is fragmented at Buldah Creek/Cann River and Back Creek (Raadik 2016). This fragmentation at Cann River is due to the presence of trout which has prevented movement within the catchment (Vic TSA 2020). As the Genoa River flows between the NSW and Victorian border, it can be inferred that the Genoa River represents one subpopulation. However, this assumes that no cause for fragmentation occurs and roundsnout galaxias's movement in the Genoa River is not restricted. Therefore, the species number of subpopulations across its national extent is estimated to be three or four, determined by the species river distribution and potential fragmentation in catchments from NSW and Victoria.

When assessing a species' threatened category eligibility, the term 'location' for this criterion is defined by the IUCN as "a geographically or ecologically distinct area in which a single

*threatening event can rapidly affect all individuals of the taxon present*". Consequently, the 2019/20 bushfires in south-eastern Australia were estimated to have overlapped with 97-100% of roundsnout galaxias distribution (Vic DELWP 2020; S Legge 2021. pers comm 25 February). The bushfires predominately impacted the species Victorian distribution as its NSW subpopulations remained directly unaffected (Vic DELWP 2020; S Legge 2021. pers comm 25 February; D Gilligan 2021. pers comm 15 June). It was estimated that 32% of the species distribution was directly fire impacted (i.e., very high risk of an aquatic sedimentation event occurring) (S Legge 2021. pers comm 25 February). Additionally, modelling to account for the potential impacts of a sedimentation event occurring estimated that a combined 89% of downstream catchments (up to 80 km) in NSW and Victoria are potentially fire impacted by sediment slugs causing an estimate of up to 100% in mortality (Legge et al. 2020; S Legge 2021. pers comm 25 February).

Therefore, the number of locations for roundsnout galaxias across its national extent is one. The impacts from the 2019/20 bushfires indicates that the species is vulnerable to a single threatening event affecting all individuals. The Committee considers the species EOO and AOO is restricted as its number of locations is one (= 1), its number of subpopulations is three or four and fragmented, and potentially in decline along with the quality of habitat available to the species. Therefore, the species appears to meet the relevant elements of Criterion 2 to make it eligible for listing as Endangered. However, the purpose of this consultation document is to elicit additional information to better understand the species' status. This conclusion should therefore be considered tentative at this stage, as it may be changed as a result of responses to this consultation process.

### Criterion 3 Population size and decline

	Critically Endangered Very low	Endangered Low	Vulnerable Limited
Estimated number of mature individuals	< 250	< 2,500	< 10,000
AND either (C1) or (C2) is true			
C1. An observed, estimated or projected continuing decline of at least (up to a max. of 100 years in future)	Very high rate 25% in 3 years or 1 generation (whichever is longer)	High rate 20% in 5 years or 2 generation (whichever is longer)	Substantial rate 10% in 10 years or 3 generations (whichever is longer)
C2. An observed, estimated, projected or inferred continuing decline AND its geographic distribution is precarious for its survival based on at least 1 of the following 3 conditions:			
(a) (i) Number of mature individuals in each subpopulation	≤ 50	≤ 250	≤ 1,000
(a) (ii) % of mature individuals in one subpopulation =	90 – 100%	95 – 100%	100%
(b) Extreme fluctuations in the number of mature individuals			

### Criterion 3 evidence

Not eligible

There is no available national estimate for the number of mature roundsnout galaxias individuals. The Victorian Threatened Species Assessment for the species (in 2020), estimates that the number of mature individuals in the Victorian subpopulation is between 2500–3500 individuals from annual monitoring data between 2002–18. However, as described under Criterion 1 there were more than 862 individuals detected in NSW between 2011–15 and therefore, the number of mature individuals across its national extent would be higher. A plausible estimate for the national extent could be the minimum bound from the Victorian subpopulation of 2500 individuals.

The total number of mature individuals borders on low when accepting the minimum plausible value of 2500 individuals, however there are sufficient data to indicate that the number of mature individuals within each subpopulation is stable or increasing, suggesting that the species has not met the required elements of this criterion. However, the purpose of this consultation document is to elicit additional information to better understand the species' status. This conclusion should therefore be considered tentative at this stage, as it may be changed as a result of responses to this consultation process.

#### Criterion 4 Number of mature individuals

	Critically Endangered Extremely low	Endangered Very Low	Vulnerable Low
<b>D. Number of mature individuals</b>	< 50	< 250	< 1,000
<b>D2.<sup>1</sup> Only applies to the Vulnerable category</b> Restricted area of occupancy or number of locations with a plausible future threat that could drive the species to critically endangered or Extinct in a very short time			D2. Typically: area of occupancy < 20 km <sup>2</sup> or number of locations ≤ 5

<sup>1</sup> The IUCN Red List Criterion D allows for species to be listed as Vulnerable under Criterion D2. The corresponding Criterion 4 in the EPBC Regulations does not currently include the provision for listing a species under D2. As such, a species cannot currently be listed under the EPBC Act under Criterion D2 only. However, assessments may include information relevant to D2. This information will not be considered by the Committee in making its recommendation of the species' eligibility for listing under the EPBC Act, but may assist other jurisdictions to adopt the assessment outcome under the [Common Assessment Method](#).

#### Criterion 4 evidence Not eligible

As stated under Criterion 3, there is no estimate for the number of mature individuals across the species national extent and the minimum plausible estimate is 2500 individuals. Therefore, the species has not met this required element of this criterion. However, the purpose of this consultation document is to elicit additional information to better understand the species' status. This conclusion should therefore be considered tentative at this stage, as it may be changed as a result of responses to this consultation process.



**Criterion 5 Quantitative analysis**

	<b>Critically Endangered Immediate future</b>	<b>Endangered Near future</b>	<b>Vulnerable Medium-term future</b>
<b>Indicating the probability of extinction in the wild to be:</b>	≥ 50% in 10 years or 3 generations, whichever is longer (100 years max.)	≥ 20% in 20 years or 5 generations, whichever is longer (100 years max.)	≥ 10% in 100 years

**Criterion 5 evidence****Not eligible**

Population viability analysis has not been undertaken. Therefore, there is insufficient information to determine the eligibility of the species for listing in any category under this criterion. However, the purpose of this consultation document is to elicit additional information to better understand the species' status. This conclusion should therefore be considered tentative at this stage, as it may be changed as a result of responses to this consultation process.

**Adequacy of survey**

The survey effort has been considered adequate and there is sufficient scientific evidence to support the assessment.

**Listing and Recovery Plan Recommendations**

No recovery plan is in place for roundsnout galaxias. A decision about whether there should be a recovery plan for this species has not yet been determined. The purpose of this consultation document is to elicit additional information to help inform this decision.

© Commonwealth of Australia 2020



### Ownership of intellectual property rights

Unless otherwise noted, copyright (and any other intellectual property rights) in this publication is owned by the Commonwealth of Australia (referred to as the Commonwealth).

### Creative Commons licence

All material in this publication is licensed under a [Creative Commons Attribution 4.0 International Licence](https://creativecommons.org/licenses/by/4.0/) except content supplied by third parties, logos and the Commonwealth Coat of Arms.

Inquiries about the licence and any use of this document should be emailed to [copyright@awe.gov.au](mailto:copyright@awe.gov.au).

### Cataloguing data

This publication (and any material sourced from it) should be attributed as: Department of Agriculture, Water and the Environment 2021, *Conservation advice for Galaxias terenasus (Roundsnout Galaxias)*, Canberra.



This publication is available at the [SPRAT profile for Galaxias terenasus \(Roundsnout Galaxias\)](#).

Department of Agriculture, Water and the Environment  
GPO Box 858, Canberra ACT 2601  
Telephone 1800 900 090  
Web [awe.gov.au](http://awe.gov.au)

The Australian Government acting through the Department of Agriculture, Water and the Environment has exercised due care and skill in preparing and compiling the information and data in this publication. Notwithstanding, the Department of Agriculture, Water and the Environment, its employees and advisers disclaim all liability, including liability for negligence and for any loss, damage, injury, expense or cost incurred by any person as a result of accessing, using or relying on any of the information or data in this publication to the maximum extent permitted by law.

### Acknowledgements

[Include acknowledgements here if relevant.]

### Version history table

[Only include any previous approved listing advices, conservation advices (not drafts) and published consultation draft assessments.]

Document type	Title	Date [dd mm yyyy]
-	-	-
-	-	-