



Galaxias mcdowalli McDowall's Galaxias

Taxonomy

Galaxias mcdowalli Raadik, 2014

Current conservation status

Listed as threatened under the *Flora and Fauna Guarantee Act 1988* (SAC 2014).

Categorised as Critically Endangered in the 2013 Advisory list of threatened vertebrate fauna in Victoria (DSE 2013).

Proposed conservation status

Critically Endangered in Australia

Criteria A3bce+4ce; B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)

Species Information

Description and Life History

The taxon is confined to freshwater and considered not to undertake diadromous migrations. It is recorded at densities of 0.15-0.18 fish/m² and collected with the native species Short-finned Eel and East Gippsland Spiny Crayfish. The spawning period is unknown, though possibly late spring to summer: fish collected in late February/early March were at an early stage of gonad development, though a male (74.2 mm Length to Caudal Fork (LCF)) appeared to be almost ripe (NMV A.30572-2), and the smallest presumed 0+ age fish recorded (33.9 mm LCF) was collected in early March (NMV A.30574-1).

Generation Length

The generation length of the McDowall's Galaxias is estimated to be 3 to 4 years. This is based on data for *Galaxias olidus*, a closely related species.

Distribution

McDowall's Galaxias is a Victorian endemic, known only from a single occurrence along ~10 km in the headwaters of the Rodger River, a tributary of the Snowy River in the coastal East Gippsland region.

Habitat

The taxon is recorded from a cool, clear flowing, heavily shaded and shallow (0.5 m) freshwater river, 3-5 m wide, with a substrate of sand, silt and clay and areas of cobble and pebble. Instream cover was provided by logs, branches and bank and vegetation overhang and pools ranged from 1-2 m in depth.

Threats

This taxon is one of a group of endemic galaxiids occurring in Victoria's eastern foothills and mountains. These taxa share ecological and habitat similarities that lead to a common suite of actual or potential threats. These taxa occur typically in small, isolated populations with limited geneflow. This may limit their adaptability to changing conditions associated with climate change.

The main threat to this taxon is invasion by Brown Trout (*Salmo trutta*) and Rainbow Trout (*Oncorhynchus mykiss*). Trout predation and competition are extreme risks and are likely to rapidly extirpate the entire population.

The catchment is crossed by major tracks, allowing easy access to streams and an increased risk of human-assisted trout introduction (either deliberately or ignorantly). The loss of riparian vegetation carries the risk of elevated water temperature and consequent impacts on food source for this taxon (aquatic invertebrates).

Other threats include fire (sedimentation, post-fire debris flow during high intensity rainfall events), severe weather events (droughts, floods), fire suppression impacts such as the use of fire retardant and increased sedimentation following disturbance from machinery, climate change and reduced water flows, and other forest management operations including road and firebreak construction and maintenance, especially at stream crossings.

Sambar deer (*Rusa unicolor*) use drainage lines as refuges after fire and can impact small water ways through trampling and grazing, increasing sedimentation and damaging riparian vegetation, particularly in dry conditions. The taxon may also have low genetic variability and be prone to inbreeding.

It is believed that all of the taxon's habitat was within the footprint of the 2019-20 bushfires (DELWP 2020). All populations were impacted and suffered a significant decline.

Spatial analysis of catchments occupied by McDowall's Galaxias across all land tenures indicates that 100% occurs within the Comprehensive, Adequate and Representative (CAR) reserve system, including parks and reserves and special protection zones in State forest.

IUCN Criteria

Criterion A. Population size reduction. Population reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4			
	Critically Endangered	Endangered	Vulnerable
A1	≥ 90%	≥ 70%	≥ 50%
A2, A3, A4	≥ 80%	≥ 50%	≥ 30%
<p>A1 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>A2 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>A3 Population reduction, projected or suspected to be met in the future (up to a maximum of 100 years) [(a) cannot be used for A3]</p> <p>A4 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 style="text-align: center;">based on any of the following:</p> <p>(a) direct observation [except A3]</p> <p>(b) an index of abundance appropriate to the taxon</p> <p>(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat</p> <p>(d) actual or potential levels of exploitation</p> <p>(e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites</p>			

Evidence:

Eligible under Criterion A3 as Critically Endangered

The population reduction over the next 10 to 12 years is projected to be greater than 95%, based on (b), (c) and (e) above.

A future population decline to extinction is likely, based on the assumption that the known threats will continue to impact the taxon.

Eligible under Criterion A4 as Critically Endangered

The population reduction over any 10 to 12 year period, including both past and future, is estimated to be 50 to 80%, based on (c) and (e) above. The causes of reduction may not have ceased, be understood or be reversible.

Past reduction is based on coarse survey data, and reduction in water level and fish abundance. Future decline is based on the likelihood that the known threats will continue to impact the taxon.

Criterion B. Geographic range in the form of either B1 (extent of occurrence) and/or B2 (area of occupancy)			
	Critically Endangered Very restricted	Endangered Restricted	Vulnerable Limited
B1. Extent of occurrence (EOO)	< 100 km ²	< 5,000 km ²	< 20,000 km ²
B2. Area of occupancy (AOO)	< 10 km ²	< 500 km ²	< 2,000 km ²
AND at least 2 of the following 3 conditions:			
(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			

Evidence:

Eligible under Criterion B1 as Critically Endangered

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 8 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA). The EoO has been made equal to the AoO to ensure consistency with the definition of AoO as an area within EoO.

It is estimated to have one location, as there is just a single occurrence and the identified threats, notably trout predation, have a non-reversible impact on the individuals of the taxon and have the potential over time to threaten most individuals.

It has a continuing decline in (i), (ii), (iii), (iv) and (v) above, based on the assumption that the known threats will continue to impact the taxon over the current ten year period and may intensify in the longer term.

Eligible under Criterion B2 as Critically Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 8 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the BA, and also derived from extrapolation based on repeated field sampling. As above, it is estimated to have one location and has a continuing decline in (i), (ii), (iii), (iv) and (v) above.

Criterion C. Small Population size and decline		Critically Endangered	Endangered	Vulnerable
Number of mature individuals		< 250	< 2,500	< 10,000
AND at least one of C1 or C2				
C1	An observed, estimated or projected continuing decline of at least (up to a max. of 100 years in future):	25% in 3 years or 1 generation (whichever is longer)	20% in 5 years or 2 generations (whichever is longer)	10% in 10 years or 3 generations (whichever is longer)
C2	An observed, estimated, projected or inferred continuing decline AND least 1 of the following 3 conditions:			
(a)	(i) Number of mature individuals in each subpopulation	≤ 50	≤ 250	≤ 1,000
	(ii) % of mature individuals in one subpopulation =	90 – 100%	95 – 100%	100%
(b)	Extreme fluctuations in the number of mature individuals			

Evidence:

Eligible under Criterion C1 as Vulnerable

It is estimated that there are 6,900 to 9,300 (midpoint 8,100) mature individuals. This is based on extrapolation from annual monitoring point data.

There is projected to be a continuing decline of 100% within three generations.

Criterion D. Very small or restricted populations		Critically Endangered	Endangered	Vulnerable
Number of mature individuals (observed or estimated)		< 50	< 250	< 1,000
D2. Only applies to the VU category 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: AoO < 20 km ² or number of locations ≤ 5

Evidence:

Eligible under criterion D as Vulnerable

The taxon is estimated to be very restricted.

Criterion E (Quantitative Analysis) was not addressed as the taxon does not have a detailed Population Viability Analysis.

References

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