

Galaxias aequipinnis East Gippsland Galaxias

Taxonomy

Galaxias aequipinnis Raadik 2014

Current conservation status

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

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

Proposed conservation status

Critically Endangered in Australia

Criteria A3ce+A4ce; B1ab(i,ii,iii,iv,v)

Species Information

Description and Life History

The taxon is a non-migratory, freshwater resident. It has been recorded at a density of 0.10-0.28 fish/m² and collected with the native species Short-finned Eel (*Anguilla australis*), Broad-finned Galaxias (*Galaxias brevipinnis*), East Gippsland Spiny Crayfish (*Euastacus bidawalus*), Gippsland Spiny Crayfish (*E. kershawi*) and Common Freshwater Shrimp (*Paratya australiensis*). The predatory alien species Brown Trout (*Salmo trutta*) is present farther downstream in the Goolengook River system. The spawning period is possibly during winter to spring but may be variable. Fish collected in late February 2002 (late summer) were at an early stage of gonad development but in late May 1992 (end of autumn) were at an advanced stage, with males running ripe and female gonads well developed and generally in a ripe stage. The majority of fish recorded in late May were > 54 mm Length to Caudal Fork (LCF), with the smallest sexually developing individual 54.8 mm LCF. Confusingly, three individuals also collected in late May were juveniles (37.0, 39.5 and 41.4 mm LCF respectively), considered of 0+ age, possibly indicating a late spawning with a possible November-December hatching.

Generation Length

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

Distribution

The taxon is a Victorian endemic, known from the Arte River system, a tributary of the Goolengook River, Bemm River catchment, in the coastal East Gippsland region of Victoria, at an elevational range of 250-390 m asl. It has been recorded downstream in the Arte River to Arte Road near Pikes Hill Track, and from the mid reaches of the Little Arte River, which joins farther downstream, though its distribution in intervening waters is unknown. Therefore, it is currently known from the headwater section of the Arte River extending 13 km from the source, and from a section of the Little Arte River extending 7 km from the source, with a combined catchment area of 46 km² (27 km² and 19 km² respectively). There is a single, small location (~ 14.6km of stream) upstream of a waterfall with trout below.



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Habitat

The taxon has been recorded from small to moderately large (1.5-6.0 m average width and 0.15-0.40 m in average depth), well-shaded and cool, clear to slightly tannin-stained streams, flowing through densely forested catchments, consisting of pools, glides and riffles, with smaller amounts of rapids and backwater areas. The substrate consisted predominantly of bedrock with boulder and cobble, with smaller amounts of gravel and coarse sand, and relatively large areas of silt deposits. Instream cover was provided predominantly by rock, vegetation overhang and timber debris, with smaller areas of aquatic vegetation, and pools averaged 0.6-0.8 m in depth (Raadik 2014).

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 the East Gippsland Galaxias 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.

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.

It is estimated that 100% of the catchments occupied by the East Gippsland Galaxias was impacted by the 2019-20 bushfires (DELWP 2020).

Forestry operations continue in parts of the range of this taxon. Spatial analysis of catchments occupied by the East Gippsland Galaxias on all land tenures indicates that 29% occurs within the Comprehensive, Adequate and Representative (CAR) reserve system, including parks, reserves and special protection zones within State forest. A further 47% is excluded from timber harvesting as it falls within the Immediate Protection Areas set aside for the protection of the Greater Glider and other threatened species. There are no species-specific protections for the East Gippsland Galaxias in the Victorian Code of Practice for Timber Production 2014 however other more general prescriptions such as protection and buffering of rainforest, old growth and waterways provide protection from timber harvesting. In recent years, modified harvesting and forest regeneration practices have been implemented in native forest that are designed to further mitigate the potential threat from forestry operations to threatened species and their habitats.

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>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>
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Evidence:

Eligible under Criterion A3 as Critically Endangered

The population reduction over the next 10 to 12 years is projected to be greater than 80%, based on (c) and (e) above.

This is based on the assumption that the known threats will continue to impact the taxon and are likely to drive it to extinction in the absence of appropriate, targeted management.

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 greater than 80%, based on (c) and (e) above. The causes of reduction may not have ceased, be understood or be reversible.

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

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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 48 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA).

The taxon is estimated to be severely fragmented and is estimated to have one location. 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.

Both subpopulations are relatively small and at risk from ongoing alien predator invasion, climate change and reduced stream flow, increased wildfire and instream sedimentation, such that there is increased extinction risk and little or no probability of recolonisation should either subpopulation become extinct.

Eligible under Criterion B1 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 48 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA. As above, it is severely fragmented, has one location and has a continuing decline in (i), (ii), (iii), (iv) and (v) above.

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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 C as Vulnerable

It is estimated that there are 8,000 to 10,600 (midpoint 9,300) mature individuals. This is based on extrapolation from annual monitoring point data.

There is estimated to be a continuing decline of greater than 80% 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

DELWP (2020) Victoria's bushfire emergency: biodiversity response and recovery. Preliminary report - Version 2. Department of Environment, Land, Water and Planning. East Melbourne. (retrieved from



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