Threatened Species Assessment

Gobiomorphus coxii
Cox's Gudgeon

Taxonomy

Gobiomorphus coxii (Krefft, 1864)

Current conservation status

Listed as threatened under the *Flora and Fauna Guarantee Act 1988* (SAC 1994).

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

Proposed conservation status

Endangered in Victoria

Criteria B1ab(i,ii,iii,v)+2ab(i,ii,iii,v)

Species Information

Description and Life History

The taxon is a freshwater species, the larvae of which possibly disperse via marine environments. Relatively mobile and possibly amphidromous. Adults thought to spawn in freshwater during late summer and early autumn, with juveniles appearing in spring. Eggs are demersal and laid on rocks, which are then fanned and guarded by the male after being fertilised. Adults and juveniles can climb instream barriers such as waterfalls and dams (Pusey et al. 2004).

Generation Length

The generation length of the Cox's Gudgeon is inferred to be 2 years. There are no data available, so this has been extrapolated from other similar-sized gudgeon taxa.

Distribution

The taxon is rarely caught, though systematic surveys have not been undertaken. It appears to be patchy in distribution and low in abundance, with no sites known where the taxon can be consistently captured. It is only known from Victoria from coastal catchments extending from Wilsons Promontory, eastward to the NSW border. More recent captures have been restricted to East Gippsland, eastward from the Mitchell River catchment. It is very abundant in coastal streams of NSW to southern Queensland. Victorian populations of the taxon are on the southern edge of its range. It is difficult to know whether populations have been established in Victoria for centuries, or have only recently (decades) established as a response to an increase in sea temperature (due to climate change), which has allowed larvae to drift further to the south.

Habitat

The taxon is found in flowing waters in rivers and creeks, usually in sections extending up to 700 m in elevation. Juveniles are found lower in rivers and estuarine waters. Adults have a preference for fast-flowing rapids, riffles and runs (Larson and Hoese 1996, Pusey et al. 2004).

Threats

Adults, newly hatched larvae and juveniles are likely to be impacted by instream barriers to migration, as well as changes to natural stream flows due to river regulation or climate change. Changes to river discharge patterns can reduce the preferred adult macrohabitats, and siltation from catchment erosion can smother the preferred spawning habitat i.e. rocks (Pusey et al. 2004).

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%

A1 Population reduction observed, estimated, inferred or suspected in the past and the causes of the reduction are clearly reversible AND understood AND ceased.

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.

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*]

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.

based on any of the following:

(a) direct observation [*except A3*]

(b) an index of abundance appropriate to the taxon

(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat

(d) actual or potential levels of exploitation

(e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites

Evidence:

Ineligible under Criterion A

There is insufficient evidence to determine whether there has been or will be a reduction in population sufficient to meet any threshold for Criterion A.

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 km²	< 5,000 km²	< 20,000 km²
B2. Area of occupancy (AOO)	< 10 km²	< 500 km²	< 2,000 km²
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 Endangered

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 1,634 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA), and also from all known field data.

It is estimated to have up to 5 locations. Juvenile recruitment is from the marine/estuarine environment and therefore there is connectivity between all populations. The most important threat is changes to stream flows, that can potentially affect all individuals in that area. However these changes may occur at different times and intensities.

. It has a continuing decline in (i), (ii), (iii) and (v) above, due to climate change impacts.

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 32 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA. As above, it is estimated to have 1 location and has a continuing decline in (i), (ii), (iii) 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:

Ineligible under Criterion C as Data Deficient

There has been no monitoring of Victorian populations so no data are available.

Criterion D. Very small or restricted population			
	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 km2 or number of locations ≤ 5

Evidence:

Ineligible under Criterion D

There is insufficient evidence to determine the number of mature individuals.

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

References

DSE (2013). *Advisory list of threatened vertebrate fauna in Victoria 2013*. Department of Sustainability and Environment, Melbourne, Victoria.

Larson, H.K. and Hoese, D.F. (1996). Family Gobiidae, subfamilies Eleotridinae and Butinae, Gudgeons. pp. 200-219. In, McDowall, R.M. (ed.). *Freshwater Fishes of South-eastern Australia.* Reed Books, Sydney. 2nd edition.

Pusey, B., Kennard, M. and Arthington, A. (2004). *Freshwater Fishes of North-eastern Australia.* CSIRO Publishing, Collingwood. 684 pp.

SAC (1994). Flora and Fauna Guarantee Scientific Advisory Committee: Final Recommendation on a Nomination for Listing. Nomination No. 304 *Gobiomorphus coxii.*