Threatened Species Assessment

Emydura macquarii
Murray River Turtle

Taxonomy

Emydura macquarii (Gray, 1830)

Current conservation status

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

Proposed conservation status

Critically Endangered in Victoria

Criteria A2abce+4ce

Species Information

Description and Life History

The Murray River Turtle is a short-necked species of turtle with a carapace that is light brown to black in colour. Body size is highly variable, with reported maximum sizes for females ranging from 180 mm to over 320 mm. Females grow very much larger than males and they have a tail that is proportionally shorter and thinner. (Thompson 1983). Hatchlings have rounded carapaces in shape tending towards a more oval carapace outline as size increases (Judge 2001).

The taxon nests in spring and lays one clutch per year, typically nesting within 20 m of the water and nests are often aggregated in preferred nesting habitat, although there is a low percentage of animals that lay multiple clutches (Thompson 1983). It is an opportunistic omnivore, primarily consuming algae, carrion and detritus, but also aquatic invertebrates and macrophytes (Chessman 1986).

Generation Length

The generation length of the Murray River Turtle is inferred to be 25 to 30 years. Age of first breeding for females is around 9-11 years (Spencer 2002) and longevity is approximately 40-50 years. Clutch size increases with the age and size of the nesting female (Judge 2001), so it is expected that older animals contribute more to successful recruitment,

Distribution

The Murray River Turtle is a wide-ranging taxon that occurs throughout many of the rivers of the eastern half of Australia. It is found primarily in the Macquarie River Basin and all its major tributaries, along with a number of coastal rivers up the New South Wales Coast. It is also found in the coastal Queensland Rivers, the Cooper Creek Ecosystem and Fraser Island. In Victoria the taxon is found in the Murray and major tributaries. There are multiple records around Melbourne, as result of deliberate introductions at some time in the past.

Habitat

The Murray River Turtle is captured most often in main river channels and backwaters, and in oxbow lakes and ponds that are close to the river (Chessman 1988). It commonly emerges to bask on logs, but is not known to undertake large overland migrations between wetlands. Males can move in excess of 100 km per year and make use of flood waters to disperse (K. Howard unpub. data).

Threats

The taxon is threatened by fox predation of nests, river regulation, drought, and the impacts of dams and weirs. Major threats to recruitment include fox predation of eggs and hatchlings, climatic drying, habitat destruction, and potentially the flooding of bank-side nests by a seasonally reversed river flow (Howard et al. 2013).

Howard (PhD thesis in prep) noted that "the population impacts of adult mortality sustained during prolonged drought events will be exacerbated by limited juvenile recruitment (Chessman 2011) due to fox predation (Thompson 1983)." and "Fox predation is a pervasive, ongoing threat that reduces nest survivorship and may regulate populations."

Howard also noted "River regulation and damming can reduce turtle diversity and density, alter population demographics, impact food web dynamics and reduce available food sources, decrease productivity downstream, prevent migratory movements, and fragment populations increasing their susceptibility to inbreeding depression, stochastic events, disease, and further habitat destruction and modification" e.g. Moll and Moll (2004). Declining water availability may be a widespread threat to freshwater turtles given predicted global impacts of climate change and water withdrawals on river flows (Chessman 2011).

In the past, turtle populations were impacted by direct culling, with the aim of preserving Murray River fisheries. "Since 1905 ...the (SA) Government have paid for the heads of 25,537 cormorants and 89,333 turtles. ...the turtles were caught in the Murray and lakes." (The Advertiser, Adelaide, 21 May 1908). Turtles were captured in much higher densities than today and the bounty, coupled with ongoing fox predation of nests, may have impacted current densities.

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:

Eligible under Criterion A2 as Critically Endangered

The population reduction over the past 75 to 90 years is estimated to be 70 to 85%, based on (a), (b), (c) and (e) above.

The taxon has declined as a result of the identified threats, notably predation by foxes on adults and nests, thus leading to significant declines in recruitment, along with climatic drying. Catch per unit effort in baited hoop nets declined by 91% for the Eastern Long-necked Turtle (*Chelodina longicollis*) and 69% for the Murray River Turtle but did not change significantly for the Broad-shelled Turtle (*C. expansa*). In addition, total catches from a range of sampling methods revealed a significantly reduced proportion of juvenile *C. longicollis* and *E. macquarii* in 2009-11, due to declining recruitment (Chessman 2011). Van Dyke et al. (2019) observed primarily adult-biased populations along the Murray River system, with little to no recruitment. The numbers of trapped individuals also decline when moving downstream.

The causes of the reduction may not have ceased, be understood or be reversible.

Eligible under Criterion A4 as Critically Endangered

The population reduction over any 75 to 90 year period, including both past and future (up to 100 years in the future), is inferred to be 65 to 80%, based on (c) and (e) above. The causes of reduction may not have ceased, be understood or be reversible.

Past reduction has been driven by the identified threats. These are expected to continue or even intensify in the absence of management interventions, driving future declines.

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 B as Endangered

The Area of Occupancy (AoO) is estimated to be 290 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas (VBA).

The Murray and Melbourne subpopulation may be subject to the same threat, namely fox predation leading to reduced recruitment, but this threat may operate at different time scales. Disease is a significant potential threat, because the taxon is already under pressure from the ongoing decline in habitat quality.

It has a continuing decline in (i), (ii), (iii) (iv) and (v) above. Declines in numbers, range and quality of habitat are well documented, especially the impacts of fox predation and reduction in water flows.

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 is insufficient evidence to determine the number of mature individuals.

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

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