

Chelodina expansa Broad-shelled Turtle

Taxonomy

Chelodina expansa Gray, 1857

Current conservation status

Listed as threatened under the *Flora and Fauna Guarantee Act 1988* (SAC 2003).

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

Proposed conservation status

Endangered in Victoria

Criterion B2ab(i,ii,iii,v)

Species Information

Description and Life History

The Broad-shelled Turtle is one of Australia's largest chelids, though the taxon displays marked sexual dimorphism, with smaller males that mature earlier than females (Spencer 2002). Males are distinguished by an elongate and thicker tail that extends beyond the margin of the carapace when mature. Maximum adult female size can reach a carapace length (CL) of 500 mm, with an additional neck length of about 65-75% of the CL (Cann 1998). Females attain a maximum mass of 7 kg and males grow to 4 kg (Bower 2012). Males reach maturity at 9-11 years and females at 14-15 years. The taxon has a cream-colored plastron and brown carapace, though the latter often appears green from filamentous algal attachment. Skin colours correspond to the plastron and carapace; dark and light colours meet in a distinct line that is evident when viewed laterally. The carapace is broadest at two-thirds of its length and ends in a triangular, shield-shaped posterior. A distinct dorsal ridge is evident in the carapace of subadult turtles but this flattens over time. The head is broad, long, and flat, with eyes that sit atop a pointed face. Two small barbels are often present on the front of the chin. The taxon cannot completely retract into its shell. The neck and legs are broad with loose skin and armour-like ridges running horizontally across the anterior section of arms and legs. Feet are large with four claws on both hind and front feet, with heavily webbed toes (Bower and Hodges 2014).

Broad-shelled Turtles nest in autumn and typically lay one clutch per year. They typically nest from 30 to 300 m from the water with nests spaced an average of 50 m apart. They are an obligate carnivore, eating decapod crustaceans, small fish and aquatic bugs (Chessman 1983). The reproductive biology of the taxon sets it apart from most other turtles; in response to low temperatures, embryos enter a diapause, which enable them to survive over winter in nests, resulting in a year-long incubation period (Bower and Hodges 2014).

Generation Length

The generation length of the Broad-shelled Turtle is inferred to be 40 to 60 years. Age of first breeding is around 14 years (Spencer 2002) and longevity is up to 50-60 years; the generation length is taken to be at the older age class. Juveniles comprise only about 14% of the total population.

Distribution

The taxon is distributed throughout the Murray-Darling River system from Queensland through to South Australia. Within Victoria the species is distributed along the Murray River and its associated tributaries and wetlands, declining in densities closer to the river mouth (Van Dyke et al. 2019). It inhabits both permanent and temporary wetlands, backwater and anabranches that are close to main river channels (Chessman 1988) and is typically trapped in low densities across all habitat types (Van Dyke et al. 2019).

Habitat

The taxon is a highly aquatic freshwater turtle that occurs mostly in lacustrine habitats too turbid to permit underwater observation and is rarely seen basking. The taxon prefers deeper water sites close to main river channels including wetlands, backwaters and anabranches (Chessman 1988), occurring in both temporary and permanent habitats (Bower 2012), which may reflect a preference for slow flowing water bodies, however it is also commonly captured in the main river channel (Howard et al 2013).

Threats

The taxon is threatened by fox predation of nests, river regulation, drought, competition and the impacts of dams and weirs. Major threats to recruitment include fox predation of eggs and hatchlings, habitat destruction, climatic drying 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)." 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).

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. It is unknown what impact this cull may have had on current densities.

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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;"><i>based on any of the following:</i></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:

Ineligible under Criterion A

There is insufficient evidence to determine whether there has been a reduction in population (criterion A2). The future population reduction does not meet the threshold for eligibility under criterion A3.

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			

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Evidence:

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 112 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas.

There are post- 2000 records around Melbourne that are presumably the result of deliberate introductions, and may have produced viable offspring, so these have been included in the assessment.

The taxon is estimated to have one to three locations. All individuals of the taxon are subject to fox predation occurring across the entire Murray-Darling Basin and leading to reduced recruitment. This threat may operate at different time scales for animals in the main Murray tributaries. Disease is a significant potential threat, because the taxon is already under pressure from the ongoing decline in habitat quality.

It is projected to have a continuing decline in (i), (ii), (iii) and (v) above. There is likely to be continuing habitat degradation, less environmental water, poorer water quality, and reduction in fish and macroinvertebrates. All of these factors will lead to a continuing decline in the number and range of mature individuals.

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 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



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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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