Threatened Species Assessment

Gramastacus insolitus
Western Swamp Cray

Taxonomy

Gramastacus insolitus Riek, 1972

Gramastacus insolitus is morphologically similar to species from the genus *Geocharax,* and is often easily confused with juvenile *Geocharax* and juvenile *Cherax* (Riek, 1972).

Current conservation status

Listed as threatened under the *Flora and Fauna Guarantee Act 1988*.

Categorised as Critically endangered in the 2009 Advisory list of threatened invertebrate fauna in Victoria (DSE 2009).

Proposed conservation status

Endangered in Australia

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

Species Information

Description and Life History

The Western Swamp Crayfish is a small (up to 40 mm OCL), burrowing crayfish belonging to the southern hemisphere crayfish family Parastacidae. Unlike most Australian crayfish taxa, it does not build burrow systems, but uses the burrows of other crayfish species during dry periods when it aestivates in cracks and depressions at the side of main burrow tunnels; consequently they are commensal upon larger crayfish taxa (Zeidler and Adams 1990, Johnston and Robson 2009a). Abundances are generally higher during spring and summer, females are gravid at about 7 mm OCL, and spawning, brooding of eggs and release of juveniles occurs during late winter to summer (Johnston 2008, Johnston et al. 2010). They have a summer brooding life-history strategy, characterised by a short life span, rapid growth, high fecundity and small eggs (Johnston 2008, Johnston et al. 2010)). Eggs are oval in shape, colour varies from mustard, light olive green to olive green, egg size ranges from 1.2 mm x 0.9 mm to 1.6 mm x 1.0 mm, and females can carry tp to 77 eggs (high fecundity and large egg size relative to body size) (Johnston 2008). The taxon is a strict herbivore/detritivore (Johnston 2008, Johnston et al. 2011).

Generation Length

The generation length of the Western Swamp Crayfish is inferred to be 1 to 2 years. Life history is unknown, so this inference is based on the suggestion by Johnston (2008) that most individuals live for 1 year, with some surviving for at least 2 years.

Distribution

The Western Swamp Crayfish is endemic to southwest Victoria and southeast South Australia, being found in coastal catchments of the Hopkins River, Glenelg River and Bool Lagoon catchments, and the inland Wimmera River basin (Zeidler and Adams 1990, van Praagh 2003, Johnston 2008, Schultz et al. 2007). In Victoria, the distribution of the taxon is primarily centred on the Grampians Ranges, within the national park, but also extends onto private land used for stock and agriculture.

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Habitat

The Western Swamp Crayfish is found almost exclusively in seasonal habitats throughout its range, such as seasonal, shallow, channel and floodplain wetlands, and along the margin of drain, marshes, fire dams and intermittently-flowing streams and within the range of two larger burrowing crayfish (*Geocharax falcata* and *Cherax destructor*) (Zeidler and Adams 1990, Johnston 2008, Johnston and Robson 2009a).

Threats

The major threat to the Western Swamp Crayfish is habitat disturbance, in particular habitat modification to, or the loss of, seasonal wetlands and swamps; essentially the decline in quality and quantity of habitat (van Praagh 2003, Johnston 2008, Johnston and Robson 2009b). This may either affect the taxon directly, or indirectly by affecting the burrowing crayfish taxa with which is commensal, allowing it to survive dry periods. This can be due to the following, many of which are predicted to be exacerbated by climate change (Johnston et al. 2014): habitat modification and disturbance arising from the construction or upgrading of roads, fire dams; burning of wetland vegetation for fuel reduction, in particular, burning during late summer/autumn when water tables are lowest; decline in quantity and quality of groundwater, or surface run-off from drought, water abstraction, or alteration to stream flows; decline or loss of vegetation due to removal or disturbance (e.g. urban or agricultural development, fire); soil disturbance (e.g. mechanical disturbance from agriculture, fire suppression activities, and erosion during floods); sedimentation/smothering from overland debris flow during high rainfall events following soil disturbance; impact of chemicals from agriculture or during fire suppression activities; and loss of food resources due to soil disturbance or loss of vegetation, leading to various ecological changes.

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 A3 as Vulnerable

The population reduction over the next 10 years is projected to be 30 %, based on (c) above.

This is based on the assumption that the known threats (e.g. impacts from climate change and agriculture) will continue to impact the taxon, primarily by affecting reducing the quality and quantity of seasonal habitat for this short-lived species.

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 1,960 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA), and also on the available records from field work. Some sites have not been revisited and therefore the continuing presence of all viable populations is unknown.

It is projected to be severely fragmented (based on genetic data (Zeidler and Adams 1990, Schultz et al. 2007), and is estimated to have 1 location. It has a continuing decline in (i), (ii), (iii), (iv) and (v) above.

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 52 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA. As above, the taxon is projected to be severely fragmented, is estimated to have 1 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:

Ineligible under Criterion C as Data Deficient

There is insufficient evidence to determine the number of mature individuals. The taxon was last targeted and located in 1982-83 (Horwitz 1990). Since then there has been no monitoring of these populations or targeted surveys.

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:

Eligible under criterion D2 as Vulnerable

The taxon is inferred to be very restricted.

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

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