Threatened Species Assessment

Thyone nigra
Sea-cucumber species

Taxonomy

Thyone nigra Joshua & Creed, 1915

Current conservation status

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

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

Proposed conservation status

Endangered in Victoria

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

It is possible that the taxon could be assessed as VU D2, on the basis of its narrow habitat requirements and restricted distribution, but it has been assessed as EN on the basis of its small range and the threats to its shallow water habitat.

Species Information

Description and Life History

The family Phyllophoridae is distinguished from other ophiurid families by the following combination of characteristics: 10-25 tentacles, calcareous ring with compound bifurcate prolongations on the radial plates or ring complex; ossicles in body wall usually include tables with four pillars, occasionally nodular buttons or fenestrated ellipsoids. Nothing is known about its life history.

Generation Length

The generation length of *Thyone nigra* is projected to be 2 to 5 years. There is insufficient field observation to support an estimate of generation length with any confidence. This is a generalisation based on body size.

Distribution

The taxon was previously thought to occur only in Corio Bay, but a taxonomic revision (O'Loughlin et al 2012) discovered that the species is more common and widespread than previously thought. In Victoria it is now known to occur at McHaffies Reef, Phillip Island, and may persist in Corio Bay. It also occurs in Tasmania, South Australia and Western Australia.

Habitat

T. nigra is a benthic, in shore suspension feeder and seems to prefer protected, very shallow (less than a few metres in depth) habitats.

Threats

The taxon occurs in shallow, protected embayments, and these areas tend to be popular for recreational activities, boating, and shipping-related activities, all of which could disturb the sea floor and damage the animals and their habitat.

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 8 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas.

It is suspected to have two locations, corresponding with the number of subpopulations, as any damage to the shallow water habitat could conceivably eliminate one or both subpopulations.

It has a continuing decline in (iii) and (v) above, based on the likelihood of damage to the shallow sea bed (e.g. from dredging, construction works, boating).

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 8 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA. As above, it has 2 locations and has a continuing decline in (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

It is inferred that there are 10,000 mature individuals, which exceeds the thresholds for criterion C.

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

It is inferred that there are 10,000 mature individuals.

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

References

DSE (2009). *Advisory list of threatened invertebrate fauna in Victoria - 2009*. Department of Sustainability and Environment, Melbourne.

Joshua, EC., and Creed, E., (1915). South Australian Holothurioidea with descriptions of new species. *Transactions Royal Society, South Australia*. 39: 16-24.

O'Hara T.D. (2002). Endemism, rarity and vulnerability of marine species along a temperate coastline. *Invertebrate Systematics* 16,671-684.

O'Hara, T. and Barmby, V. (2000) *Victorian Marine Species of Conservation Concern: Molluscs, Echinoderms and Decapod crustaceans*. p. 35 Parks Flora and Fauna Division. Department of Natural Resources and Environment: Melbourne.

O'Loughlin P.M., Barmos S., van den Spiegel D. (2012). The phyllophorid sea cucumbers of southern Australia (Echinodermata: Holothuroidea: Dendrochirotida: Phyllophoridae). *Memoirs of Museum Victoria* 69,269-308.

SAC (2003). Flora and Fauna Guarantee Scientific Advisory Committee: Final Recommendation on a Nomination for Listing. Nomination No. 628 *Thyone nigra*