Threatened Species Assessment

Microseris scapigera
Plains Yam-daisy

Taxonomy

Microseris scapigera (Sol. ex A. Cunn.) Sch. Bip.

Current conservation status

Categorised as Vulnerable in the 2014 Advisory list of rare or threatened flora (DEPI 2014).

Proposed conservation status

Critically Endangered in Victoria

Criteria A2ace+3ce+4ace

Species Information

Description and Life History

The taxon is a perennial, 5-25(-40) cm high; roots fleshy and fibrous. Leaves linear, 5-25 cm long, 0.5-5 mm wide, entire or rarely with a few distant linear lobes. Capitula 20-30 mm diam.; peduncles to 25 cm long, usually c. as long as leaves; involucral bracts ovate to narrow-lanceolate, 2-17 mm long, acute. Florets 6-20; ligules 10-15 mm long, slightly exceeding involucre. Cypselas mostly 7-10 mm long, whitish, glabrous; pappus of 30-66 barbellate bristles, 7-12 mm long, hardly widened at base. The taxon flowers mainly from spring to summer (VicFlora 2017).

Generation Length

The generation length of *Microseris scapigera* is estimated to be 50 to 80 years. Generation length cannot be estimated with confidence since it is unclear whether the branched, fleshy roots of this taxon replace themselves annually or at some irregular frequency. *M. scapigera* may behave like the closely related *M. walteri* (Murnong or Yam Daisy). The mother tuber of established plants is replaced annually by a daughter tuber (Walsh 2016), potentially conferring indefinite longevity on the plant. If the root system of *M. scapigera* is long-persistent then longevity is likely to be indefinite and generational turnover is potentially at the multi-decadal scale and determined by the causes and frequency of mortality and recruitment success. If, on the other hand, the root system of the taxon does not replenish itself regularly, then longevity and generation time are expected to be significantly shorter. The suggested nominal generation time of 50 years (with a suggested notional upper bound of 80 years) integrates the two extreme scenarios.

Field observations of monitored stands in gilgai habitats on the Victorian Volcanic Plain suggest adult plants are long-lived with no clear evidence of seed recruitment, which is inferred to be a rare event cued potentially by fire and/or exceptionally favourable seasons or by localised site disturbance events which, in pre-European times, are expected to have included intentional Aboriginal cultivation of gilgai or other wetland habitats (although not necessarily for this taxon). It is unclear whether Aboriginal people utilised *M. scapigera* as a valuable food item as is clearly documented for *M. walteri*, although there is circumstantial historical evidence that *M. scapigera* may also have been used (Walsh 2016).

Distribution

The taxon was formerly widespread on the basalt plains of western Victoria but is now very rare due to loss of habitat. The taxon also occurs in Tasmania and New Zealand (VicFlora 2017). Reliable site and specimen records

indicate that the taxon extends beyond the Victorian Volcanic Plains to the Western Wimmera, the Dundas Tableland, and the plains to the immediate south-east of Melbourne.

Habitat

The taxon is widespread in moist depressions on the basalt plains of western Victoria (VicFlora 2017). On the Victorian Volcanic Plains, the taxon typically occupies gilgai depressions, but elsewhere the habitat range extends to permanently moist wetlands typically dominated by *Lepidosperma congestum* (Clustered Sword-sedge) and *Chorizandra enodis* (Black Bristle-sedge) in the Western Wimmera, or *Amphibromus* taxa (Wallaby grasses) as at Clunes Swamp.

Threats

The taxon is a habitat specialist dependent on the stability of moist depressions on heavy soil plains. Historically, the taxon has suffered a massive decline throughout its range in response to intense livestock grazing, conversion of native pasture to exotic pasture, and habitat loss due to intensive cropping.

Current and projected threats include incremental habitat loss and modification in response to agricultural intensification, weed invasion, targeted browsing and pugging of wetland habitats by exotic herbivores, climatic warming and drying resulting in extreme drought stress, and inappropriate fire regimes.

Aggressive, exotic, transformer weeds such as *Phalaris aquatica* (Toowoomba Canary-grass) and *Lophopyrum ponticum* (Tall Wheat-Grass) present existential threats to almost all occurrences of *M. scapigera* on the Victorian Volcanic Plains.

Some occurrences on freehold sites may also be threatened by wetland drainage works and by the incremental encroachment of intensive cropping into wetland habitats. Remnant stands to the immediate north-west, north, and south-east of Melbourne are also threatened by urban and peri-urban development as a result of the expansion of the Melbourne Metropolitan area. Some occurrences, such as those in Young's Scrub in the far south-western Wimmera, may be threatened by the proposed expansion of sand mining.

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 150 to 240 years is estimated to be 80 to 99% (midpoint 95%), based on (a), (c) and (e) above.

The estimate of past decline is based on the identified threats, notably the almost complete elimination of habitat across the Victorian Volcanic Plains, which was the stronghold of the taxon, through intensive livestock grazing and cropping from the earliest days of European settlement.

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

Eligible under Criterion A3 as Critically Endangered

The population reduction over the next 100 years is projected to be 80%, based on (c) and (e) above.

Future decline is based on the projected impact of the identified threats, such as agricultural intensification, weed invasion, targeted browsing and pugging of wetland habitats by exotic herbivores, climatic warming and drying resulting in extreme drought stress, and inappropriate fire regimes.

Eligible under Criterion A4 as Critically Endangered

The population reduction over any 150 to 240 year period, including both past and future (up to 100 years in the future), is estimated to be 95 to 99%, based on (a), (c) and (e) above. The causes of reduction may not have ceased, be understood or be reversible.

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 B2 as Endangered

The Area of Occupancy (AoO) is estimated to be 124 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas.

The taxon is estimated to be severely fragmented anthropogenically at the landscape scale, and potentially also naturally at the regional and landscape scales. Given the extreme fragmentation of habitat across the Victorian range of the taxon, it is difficult to assess the level of natural pre-settlement fragmentation at either the regional, subregional or landscape scales. Geographically isolated occurrences are separated at spacings which are likely to exceed the dispersal range of the taxon which is likely to be wind-dispersed at the 100-1000 m scale.

It is estimated to have 3 to 4 locations, and has a continuing decline in (i), (ii), (iii), (iv) and (v) above based on the impacts of the identified threats.

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 no available estimate of population size for the taxon, although it is likely to exceed 1,000 mature individuals. Limited quadrat data suggests the taxon tends to occur at low density at this scale.

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 estimated to be very restricted.

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

References

DEPI (2014). *Advisory list of rare or threatened plants in Victoria - 2014.* Department of Environment and Primary Industries, Melbourne. Retrieved from: https://www.environment.vic.gov.au/__data/assets/pdf_file/0021/50448/Advisory-List-of-Rare-or-Threatened-Plants-in-Victoria-2014.pdf

VicFlora (2017). Flora of Victoria, Royal Botanic Gardens Victoria: *Microseris scapigera*. Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/0227cb8c-4a85-47ae-9b9e-24d4ba831aae

Walsh, N.G. (2016). A name for Murnong (*Microseris*: Asteraceae: Cichorioideae). *Muelleria* 34, 63-67.