Threatened Species Assessment

Poa poiformis var. *ramifer*
Dune Poa

Taxonomy

Poa poiformis var. *ramifer* D.I. Morris

Apart from its ramifying habit there appear to be no reliable characters to separate this taxon from *Poa poiformis* var. *poiformis* and it may be that the variation is at least partly ecotypic - occurring when plants are partly buried by mobile sand or when plants are growing in shade (VicFlora 2016).

There has been considerable confusion over the application of this name, sometimes being referred to a fine-leaved coastal grass with an extremely contracted inflorescence, mostly tussock-forming but sometimes ramifying. This latter entity appears to be close to, if not conspecific with, *P. halmaturina* J.M.Black and is tentatively treated as such here. It is more often associated with calcareous sands or shallow silliceous sands overlying basalt (VicFlora 2016a).

Current conservation status

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

Proposed conservation status

Endangered in Victoria

Criteria A2ce+4ce; B2ab(ii,iii,iv,v)

Species Information

Description and Life History

Poa poiformis is a perennial grass to c. 1 m high. Leaves usually stiffly erect and sharp-tipped, sometimes exceeding the inflorescence, often somewhat glaucous; sheath pale, or rarely purplish, glabrous, smooth to minutely scabrous; blade usually closely inrolled and 0.5-1.5 mm diam. less often loosely inrolled or folded, to 2 mm wide when flattened, entirely smooth to slightly finely scabrous on the outer surface, scabrous to shortly pubescent on the inner surface; ligule truncate, firmly membranous, c. 0.5 mm long. Inflorescence usually a narrow, rather dense panicle, to c. 30 cm long and occasionally looser and the lower branches widely spreading. Spikelets 2-7-flowered, 5-8 mm long, green or straw-coloured; glumes 3-nerved (or the lower occasionally 1-nerved), the upper slightly longer than lower and equal to or slightly longer than the lowest lemma; lemma 5-nerved, rather narrow 3-6 mm long, conspicuously hairy along keel and lateral nerves below midway, occasionally with some hairs on the lower internerves, very rarely almost glabrous; web usually well-developed (VicFlora 2016b).

Variety *ramifer* is distinguished from the type variety by its elongated rhizomes or stolons and its sheaths and lower internodes or stolons which are commonly purplish or reddish-pigmented. The taxon flowers from September to February (VicFlora 2016a).

Generation Length

The generation length of *Poa poiformis* var. *ramifer* is estimated to be 70 years. This is based on an estimated longevity of 70 years or more and the likelihood that the taxon recruits sporadically and opportunistically in response to seasonal conditions from a soil-stored seedbank. The taxon is a long-rhizomatous or stoloniferous perennial which can propagate vegetatively indefinitely through shifting sands on primary foreshore dunes subject to strong onshore winds. The paucity of site and specimen records, and the consistently low population densities

observed in the field, suggest that recruitment is a naturally rare event for reasons which are not self-evident, given the extent of apparently suitable unoccupied habitat.

Distribution

The taxon is largely coextensive with var. *poiformis* which occurs along the entire Victorian coastline, but is apparently uncommon, and known from scattered coastal sites such as Cape Bridgewater, the Otway Coast, Portsea, and Mallacoota areas (VicFlora 2016a). It has an apparently discontinuous occurrence along the Victorian coast where it was reliably collected at Glenaire Beach and the Aire River estuary near Hordern Vale in the Western Otways, Barwon Heads on the Bellarine Peninsula, Portsea on the Mornington Peninsula, Great Glennie, Citadel and Dannevig Islands west of Wilsons Promontory, Wattle Island south of Wilsons Promontory, Rabbit Island east of Wilsons Promontory, Sandpatch Point east of the Wingan River in far East Gippsland and Tullaberga Island east of Mallacoota. Unvouchered site records suggest the taxon also occurs at Eastern View near Aireys Inlet in the Eastern Otways, Point Lonsdale on the Bellarine Peninsula, Point Nepean to Cape Schanck on the Mornington Peninsula, Seaford on the eastern shoreline of Port Phillip Bay, French Island in Westernport Bay, Cape Woolamai on Phillip Island, Harmers Haven near Cape Paterson, Shellback and Norman Islands west of Wilsons Promontory, Easby Creek foreshore east of Wingan Inlet and Gabo Island east of Mallacoota.

A specimen record for Shelly Beach near Cape Bridgewater and unvouchered site records for Black Swamp on Discovery Bay and at Port Fairy in the far South West are of uncertain identity and may be referable to *Poa halmaturina* as discussed by Walsh in VicFlora (2020).

It is widespread in Tasmania and the Bass Strait islands and is recorded also in Western Australia and South Australia, and apparently also on Lord Howe Island

Habitat

The taxon is apparently restricted to coastal sand dunes where it is typically associated with *Acacia longifolia* subsp. *sophorae* (Coast Wattle), *A. uncifolia* (Coast Wirilda), *Alyxia buxifolia* (Sea Box), *Austrostipa stipoides* (Prickly Spear-grass), *Banksia integrifolia* (Coast Banksia), *Carex pumila* (Strand Sedge), *Correa alba* (White Correa), *Ficinia nodosa* (Knobby Club-sedge), *Lachnagrostis billardierei* (Coast Blown-grass), *Leptospermum laevigatum* (Coast Tea-tree), *Leucophyta brownii* (Cushion Bush), *Lepidosperma gladiatum* (Coast Sword-sedge), *Leucopogon parviflorus* (Coast Beard-heath), *Melaleuca lanceolata* (Moonah), *Myoporum insulare* (Common Boobialla), *Olearia axillaris* (Coast Daisy-bush), *Ozothamnus turbinatus* (Coast Everlasting), *Pimelea serpyllifolia* (Thyme Rice-flower), *Pomaderris paniculosa* subsp. *paralia* (Coast Pomaderris), *Rhagodia candolleana* (Seaberry Saltbush), *Senecio odoratus* (Scented Groundsel), *Spinifex sericeus* (Hairy Spinifex), *Tetragonia implexicoma* (Bower Spinach) and *Threlkeldia diffusa* (Coast Bonefruit).

Site data indicates the taxon typically occurs with projective foliage cover less than 1%, 1-5% or 5-25%, only exceptionally exceeding 25% at the quadrat scale.

Threats

The taxon is a habitat specialist that is reliant on calcareous or siliceous coastal dunes for its persistence. Both the plants and their habitat are threatened by foredune and beach erosion of the seaward edge of primary dunes by storm surges. These threats are projected to increase in frequency and intensity in response to climate change and sea level rise. The impact of coastal instability may, however, be compensated by promotion of the taxon by stimulating seed recruitment or vegetative spread of the rhizome or stolon to keep pace with mobile sand movements.

The taxon is also threatened by highly competitive, invasive, exotic environmental weeds such as *Euphorbia paralias* (Sea Spurge), *Cakile* species (Sea Rocket), *Dipogon lignosus* (Common Dipogon), *Senecio angulatus* (Climbing Groundsel), *Senecio elegans* (Purple Groundsel), *Coprosma repens* (Mirror Bush), *Polygala myrtifolia* (Myrtle-leaf Milkwort) and the grasses *Ammophila arenaria* (Marram Grass), *Cenchrus clandestinus* (Kikuyu), *Lagurus ovatus* (Hare's-tail Grass) and *Stenotaphrum secundatum* (Buffalo Grass). Each of these exotics has the capacity to transform the habitat of *Poa poiformis* var. *ramifer* and each is classed as a transformer weed. Any one of these taxa alone can successfully compete with, and potentially exclude, the taxon by competing for light and space. In the past, the seaward edge of primary dunes has been the habitat typically colonised by *Cakile maritima* subsp. *maritima* (Sea Rocket) and *Cakile edentula* (American Sea Rocket). *Euphorbia paralias* (Sea Spurge) is

currently progressing eastward along the coast of Victoria, forming dense monocultures which exclude all other plant species, as it has in Western Australia, South Australia, and northern Tasmania.

The habitat is also threatened by recreational activity such as unregulated heavy foot traffic to access the foreshore, the use of 4WD vehicles and dune buggies, and horse riding.

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 Endangered

The population reduction over the past 210 years is estimated to be 30 to 50%, based on (c) and (e) above.

An estimate of past decline is based on the impact of the identified threats, notably weed invasion, coastal instability, and recreational activity.

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

Eligible under Criterion A3 as Vulnerable

The population reduction over the next 100 years is projected to be 20 to 30%, based on (c) and (e) above.

This is based on the projected impact of the identified threats.

Eligible under Criterion A4 as Endangered

The population reduction over any 210 year period, including both past and future (up to 100 years in the future), is estimated to be 30 to 50%, based on (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) across the taxon's range is estimated to be 120 to 132 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas. The lower bound estimate excludes unvouchered site records at Discovery Bay and Port Fairy; these may be referable to *Poa halmaturina*.

The taxon is estimated to be severely fragmented naturally at the regional and landscape scales. Geographically isolated occurrences are separated from each other at spacings exceeding the dispersal range of the taxon, which has no specialised mechanism for long-distance dispersal. This precludes the possibility of recolonisation in the event of local extinction.

It is estimated to have 1 location since the key identified threats operate consistently across the Victorian range of the taxon and can rapidly affect all individuals of the taxon present

It has a continuing decline in (ii), (iii), (iv) and (v) above, based on the current and projected impact 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

It is suspected that there are 1,000 to 2,000 mature individuals, but the qualifier is too weak to meet this criterion.

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 (2016a). Flora of Victoria, Royal Botanic Gardens Victoria: *Poa poiformis* var. *ramifer*. Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/c18c7c7b-813b-435a-9542-ec94e46afbf1

VicFlora (2016b). Flora of Victoria, Royal Botanic Gardens Victoria: *Poa poiformis*. Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/c3acd70b-c192-4ca9-88fe-310d0b9fa595

VicFlora (2020). Flora of Victoria, Royal Botanic Gardens Victoria: *Poa halmaturina*. Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/19380ad2-62b1-453c-b689-1ec3eb1dd49f