# Threatened Species Assessment

## *Bertya grampiana*
## Grampians Bertya

### Taxonomy

*Bertya grampiana* Halford & R.J.F. Hend.

### Current conservation status

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

### Proposed conservation status

Critically Endangered in Australia

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

### Species Information

#### Description and Life History

The taxon is an erect shrub 2-4 m high; branchlets whitish-tomentose, becoming glabrous but tuberculate by persistent hair bases. Leaves linear to narrowly obvate, 19-39 mm long, 2.5-4.5 mm wide, apex acute to obtuse, base tapering into petiole, margins recurved, upper surface dark green and glabrous, lower surface paler with a velvety covering of stellate hairs; petiole 0.9-1.5 mm long. Flowers solitary, on peduncles 1-4 mm long; bracts 5-7, 1-3.5 mm long, glabrous to tomentose. Male flowers sessile or with pedicels to 0.5 mm long; perianth segments ovate, 4.5-5 mm long, glabrous. Female flowers with pedicels 0.3-1.1 mm long; perianth segments ovate or narrowly triangular, 2.8-3.2 mm long, glabrous; styles deeply 3- or 4-lobed. Capsule ovoid, 6.5-7.5 mm long, glabrous to sparsely stellate-hairy. The taxon flowers mostly spring and summer (VicFlora 2017).

#### Generation Length

The generation length of *Bertya grampiana* is estimated to be 10 to 30 years. The plants apparently regenerate well after fire. It is unclear, although seemingly unlikely, if the taxon is reliant on fire for recruitment. Recruitment is likely to be linked with disturbance, with minor flooding events probably also promoting recruitment.

#### Distribution

The taxon is endemic to the Grampians in Victoria, where it is found along a single creek line (Deep Creek) East of Harrop Track.

#### Habitat

The taxon occurs in dense riparian scrub, where it grows on narrow alluvial plains forming beside creeks during high water flows.

#### Threats

The taxon is at risk from climatic drying of its riparian habitat; repeat fire at intervals that result in the failure to maintain or replenish seed banks; recruitment failure; and seed production compromised by the apparent tendency for plants to be either female or male, that is, subdioecious (despite the taxon being previously described as monoecious). There is a demonstrable risk of gross site modification by storm activity leading to flash flooding of valleys throughout the Grampians, resulting in deposition of silt and rubble eliminating all riparian vegetation. This risk is exacerbated by drought, fire, and torrential rainfall. All plants occur in a single catchment.

## 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 Endangered**

The population reduction over the next 30 to 90 years is projected to be 30 to 50%, based on (c) above.

There is a risk of increased drought leading to the drying of habitat, and increased fire frequency, with the possibility of large flooding (in the absence of vegetation) following fire. Such flooding is a serious risk to the specific habitat required by this taxon, as it likely to cause mortality of adult plants and reduce recruitment due to reduced seed production, or mortality of seedlings.

**Eligible under Criterion A4 as Endangered**

The population reduction over any 30 to 90 year period, including both past and future (up to 100 years in the future), is projected to be 30 to 50%, based on (c) above.

No decline is suspected in the past 3 generations. Plants are in a restricted and rather remote area, therefore, there is no indication that there has been reduction. It is probably a naturally restricted taxon.

| 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 Critically 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 (VBA).

The taxon is estimated to be severely fragmented. Individual occurrences are considered severely fragmented based on the taxon's limited dispersal ability, the barriers to dispersal and/or the lack of habitat separating them. Such fragmentation precludes the possibility of recolonisation in the event of local extinction.

It is estimated to have 1 location and has a continuing decline in (iii) and (v) above, based on the current and projected impact of the identified threats, in particular, changes in habitat suitability caused by predicted climatic drying.

**Eligible under Criterion B2 as Critically 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, the taxon is estimated to be severely fragmented, have 1 location, 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:

**Eligible under Criterion C as Endangered**

It is estimated that there are 400 to 1,000 mature individuals. This is based on estimates made on site. An assessment in November 2018 found about 200 plants in 100 m length of the creek (i.e. the main known stand). Many more plants are likely further upstream. The exact counts are difficult due to the dense vegetation. It is possible to be confident that there are at least 400 plants, but possibly as many as 1000 plants.

There is estimated to be a continuing decline of 10 to 30% within two generations.

| 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<br>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:<br>AoO < 20 km2 or number of locations ≤ 5 |

## Evidence:

**Eligible under criterion D as Vulnerable**

It is estimated that there are 400 to 1,000 individuals, and 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: *Bertya grampiana.* Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/673beaf2-710e-4b31-915c-e882f650a95d