

# THREATENED SPECIES SCIENTIFIC COMMITTEE

Established under the *Environment Protection and Biodiversity Conservation Act 1999*

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The Minister's delegate approved this Conservation Advice on 16/12/2016.

## Conservation Advice

### *Deyeuxia pungens*

narrow-leaf bent-grass

#### Conservation Status

*Deyeuxia pungens* (narrow-leaf bent-grass) is listed as Vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act) effective from the 16 July 2000. The species was eligible for listing under the EPBC Act as on 16 July 2000 it was listed as Vulnerable under Schedule 1 of the preceding Act, the *Endangered Species Protection Act 1992* (Cwlth).

The species can also be listed as threatened under state and territory legislation. For information on the current listing status of this species under relevant state or territory legislation, see <http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl>.

The main factors that are the cause of the species being eligible for listing in the Vulnerable category are its limited extent of occurrence and area of occupancy, and small population size.

#### Description

The narrow-leaf bent-grass is a tufted perennial grass growing to 1 m tall. Leaves are long and thin, to 45 cm long and 1.5 mm wide, strongly ribbed, in-rolled, hairless, slightly rough to the touch and with a sharp point. The ligule (strap-shaped appendage facing towards the base of the leaf blade) is up to 11 mm long, hairless and papery. The inflorescence (arrangement of flowers) is a contracted, spike-like panicle 10 - 30 cm in length and may be lobed or interrupted near the base. The glumes (two bracts at the base of the inflorescence) are up to 5 mm long and finely tapered. The lemmas (the lower of two bracts enclosing each individual flower) are up to 5 mm long, irregularly toothed at the tip, have 5 - 7 nerves (short veins) and have a short tuft of hairs at the base. A tiny awn (hair-like appendage), to 0.5 mm long, is sometimes attached just below the tip of the lemma (Carter & Walsh 2006).

#### Distribution

According to the Department of Environment, Land and Water Planning (Victoria) (DELWP) Actions for Biodiversity Conservation database (2013), there are two populations of the narrow-leaf bent-grass: one on Ballantyne Hill 1, south of Suggan Buggan, and the other adjacent to Ingeegoodbee Track, north of Suggan Buggan. Both populations are located in the Alpine National Park in eastern Victoria (Walsh 1992). The altitudinal range of the known populations is 800 - 870 m above sea level. It is likely that additional populations occur in remote and inaccessible areas in the vicinity of the two existing populations in Victoria and possibly in areas just across the New South Wales border approximately 13 km away (Walsh 1992).

During a study of the recovery of threatened plant species following the 2003 wildfires in the region, an estimated 230 individuals of the species were recorded at Suggan Buggan, but none at the Ingeegoodbee Track site (DSE 2008). In 2006, the subpopulations on the Ballantyne Hill 1 consisted of an estimated 170 plants, with potentially more individuals in less accessible areas nearby, and the population situated adjacent to Ingeegoodbee Track consisted of 53 individuals (Carter & Walsh 2006). According to the Victorian Government Department of Sustainability and Environment (DSE) (2008), an estimated 200 - 400 individuals of the species existed in 2008.

## Relevant Ecology

Little is known of the biology or ecology of the narrow-leaf bent-grass (Carter & Walsh 2006). The species flowers in December and January (Carter & Walsh 2006; Walsh 1994) and continues to produce seed to March (Walsh 1992). The seed is reported to be short lived and exhausted after a single germination event. The fecundity of seed is known to be very high with 100 percent viability reported in germination trials (Coates et al., 2004). The subpopulations on Ballantyne Hill 1 were studied in 2004 after the wildfire that burned through the region in the summer of 2003. Coates and colleagues (2004) noted that this population regenerated well after the fire by resprouting from the bases of tussocks.

The narrow-leaf bent-grass is known only from bare sandstone crags and dry rocky woodland in rain-shadow country (Walsh 1994). Both of the known populations occur on skeletal soils developed on Snowy River volcanics (Carter & Walsh 2006). The species is most abundant in crevices and on ledges on the steepest, most exposed cliff lines. There are fewer plants in flatter areas (Carter & Walsh 2006).

The population on the summit of Ballantyne Hill 1 grows in brown loamy soil (Downe 2008) amongst rocks on and near the summit area of a series of turret-like projections of Silurian granite or granodiorite (Walsh 1992). The species is associated with *Eucalyptus dives* (broad-leaved peppermint), *E. rubida* (candlebark gum), *Acacia obliquinervia* (mountain hickory wattle), *Exocarpos cupressiformis* (native cherry), *Kunzea peduncularis* (burgan), *Leionema lamprophyllum* (shiny leionema), *Olearia iodochroa* (violet daisy-bush), *Ozothamnus obcordatus* (grey everlasting), *Ozothamnus conditus* (pepper everlasting), *Cassinia aculeata* (common cassinia), *C. longifolia*, *Philotheca trachyphylla* (rock wax-flower) and *Platysace lanceolata* (shrubby platysace) (Carter & Walsh 2006; Downe 2008).

The Ingeegoodbee Track population occurs in dry woodland (Carter & Walsh 2006). It is associated with *Bursaria spinosa* subsp. *lasiophylla* (hairy bursaria), *Eucalyptus macrorhyncha* (red stringybark), *Eucalyptus nortonii* (silver bundy), *Eucalyptus albens* (white box), *Indigofera australis* (Austral indigo), *Leucopogon fletcheri* subsp. *brevisepalus* (twin-flower beard-heath) and native cherry (Carter & Walsh 2006).

## Threats

According to Carter and Walsh (2006), there is no information available on the past distribution and abundance of the narrow-leaf bent-grass. Therefore, it is not possible to determine if the species has suffered any decline in its extent of occurrence or abundance.

Table 1 – Threats affecting the narrow-leaf bent-grass in approximate order of severity of risk, based on available evidence.

Threat factor	Threat type	Evidence base
Damage to populations or habitat		
Grazing and habitat degradation by herbivores	known current	<p>In 2004 (approximately one year post-wildfire), 25 % of the narrow-leaf bent-grass subpopulations occurring on the flat area at the top of Ballantyne Hill 1 consisted of immature plants and no damage by herbivores was reported (Coates et al., 2004). When these sites were surveyed again in 2008, no immature plants were seen and severe herbivore damage was observed in mature tussocks (Downe 2008). Herbivore scats, predominantly those of feral goats (<i>Capra hircus</i>) but also those of deer species (<i>Cervus</i> spp.), were found by Downe (pers. comm. 2016) at the Ballantyne Hill 1 sites. The mature tussocks were most likely to have been dug by feral goats attempting to access the short young, palatable shoots at the bases of the tussocks (Downe 2008).</p> <p>Trampling of narrow-leaf bent-grass and its habitat by feral goats and deer species could also occur but the potential damage is considered minor compared to the impact of the digging and grazing (Carter &amp; Walsh 2006; DEWHA 2008; Downe 2008).</p> <p>Feral goats are capable of negotiating the steep rocky terrain where a majority of the narrow-leaf bent-grass are known to occur (Carter &amp; Walsh 2006). However, the subpopulations growing down the steep rocky slopes and cliff face of Ballantyne Hill 1 were not affected Downe (2008).</p>
Track maintenance activities	potential current	The population occurring beside Ingeegoodbee Track has been observed to be at risk of being damaged or destroyed by maintenance vehicles during track maintenance activities (Carter & Walsh 2006).
Trampling by recreational bushwalkers	potential current	The population on Ballantyne Hill 1 has been observed to be at risk of being damaged or destroyed as a result of intermittent trampling by visiting bushwalkers (Walsh pers. comm. 2001).
Effects on the species and its environment as a result of climate change		
Global climate change	potential	It is predicted that climate change will have a significant effect on alpine plant diversity, including the narrow-leaf bent-grass, and on the structure and function of alpine plant ecological communities by impacting upon their physiology, timing of life cycles and their interactions with other species. This will subsequently lead to the redistribution of those ecological communities and changes in their structure and composition (ANBG 2009).

## **Conservation Actions**

### **Conservation and Management priorities**

#### Damage to populations or habitat

- Design, install and maintain adequate fencing around subpopulations of the species, where necessary, to exclude herbivores, particularly feral goats, and protect those subpopulations.
- Install and maintain signage indicating the occurrences of narrow-leaf bent-grass populations and the importance of avoiding damage to them or their habitats, at sites where the species is known to occur.
- Identify and implement measures to avoid direct and potential indirect impacts on narrow-leaf bent-grass populations and their habitats from track maintenance works.

#### Effects on the species and its environment as a result of climate change

- Ex situ seed banks provide an important capacity for medium to long-term storage of diaspores (spores, seeds, dispersal units) of threatened plant species. Where storable narrow-leaf bent-grass seeds are available, seed banking should be undertaken in consultation with relevant seed storage professionals as to appropriate conditions (collection and post-harvest treatment; pre-storage drying; storage temperature; curation and auditing) to ensure seed viability is retained.
- Seed should be appropriately sourced and stored in existing seed bank facilities using best practice seed storage guidelines and procedures to maximise seed viability and germinability.
- Maintain existing representative ex situ collections of propagated/cultivated individuals of the narrow-leaf bent-grass to safeguard against the any unforeseen destruction of wild populations (Carter & Walsh 2006).
- Continue to collect and store seed from all known populations to maintain adequate representation of the genetic diversity of the species. Record the source and parentage of all seed collected.
- Consider implementing a programme to translocate cultivated individuals of the species to areas of suitable habitat in response to the threat of climate change. Devise and implement such a translocation programme in accordance with the protocols recommended by Vallee and colleagues (2004).

#### Stakeholder Engagement

- Ensure that relevant track maintenance workers are aware of the location of the narrow-leaf bent-grass population at Ingeegoodbee Track, the importance of avoiding damage to that population and the surrounding environment, and how to mitigate the risk of adverse impacts on the population.
- Identify opportunities for, and promote and support, the involvement of community groups and volunteers in recovery activities for the species.
- Continue to electronically update available information about the species, including information about its appearance, habitat, threats, recovery actions and the importance of locating, monitoring and protecting populations over the long-term.

## **Survey and monitoring priorities**

- Continue to monitor known narrow-leaf bent-grass populations and their habitats, preferably annually and during the optimal survey period for the species: December to January.
- During monitoring of known populations, collect detailed information on each population, including: the area and extent of known populations; recruitment and mortality; evidence of seed production in the presence of old culms, including seed bank status; the size and age structure of those populations; morphological data; floristic and environmental information relevant to the condition of the ecological communities in which the species occurs; damage to populations and their habitats as a result of feral goats; and the condition of feral goat exclusion fencing.
- Survey suitable habitat and surrounding ecological communities to locate any new or unconfirmed populations of the narrow-leaf bent-grass.
- Accurately map all populations.
- Measure the effectiveness of management actions and assess the need to adapt them if necessary.

## **Information and research priorities**

- Research key biological functions of the species. Evaluate the timing of life-history stages and their timeframes, fecundity, seed longevity and viability, and recruitment levels.
- Research disturbance regimes and seed germination requirements by conducting laboratory and field trials in order to maintain habitat or promote recruitment and regeneration of populations.
- Investigate the optimal fire regime (frequency and intensity) for regeneration of populations and their habitats.
- Research and assess the ecological requirements of the species in order to mitigate the threat of climate change.
- Conduct a genetic analysis of tissue samples obtained from the seed of each individual recorded during monitoring in order to verify the identity of the species and determine the genetic structure/diversity in each population.
- Analyse demographic data to infer or estimate population trends and responses against recovery actions. Collate and analyse census data, compare with management histories and conduct population viability analyses.
- Investigate options for linking, enhancing or establishing additional populations. This analysis requires information on the genetic structure/diversity in the known populations.

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