

***Bossiaea fragrans* K.L.McDougall (Fabaceae)**

Distribution: Endemic to NSW

Current EPBC Act Status: Not listed

Current NSW TSC Act Status: Critically Endangered

Proposed change for alignment: List on EPBC Act as Critically Endangered.

Conservation Advice: *Bossiaea fragrans*

Summary of Conservation Assessment

Bossiaea fragrans is found to be eligible for listing as Critically Endangered under Criterion B1ab(v)+B2ab(v).

The main reasons for the species being eligible for listing in the Critically Endangered category are that i) the species has a very highly restricted geographic range with extent of occurrence (EOO) and area of occupancy (AOO) estimated to be 4-8 km²; ii) it is found at only one location; and iii) continuing decline in the number of mature individuals is inferred because of ongoing impacts from goats and pigs. In addition, *Bossiaea fragrans* has a total population of only 400 plants.

Assessment against IUCN Red List criteria

Criterion A Population Size reduction

Assessment Outcome: Data Deficient.

Justification: To be listed as threatened under Criterion A the species must have experienced a population reduction of $\geq 30\%$ over three generations or 10 years (whichever is longer). There is insufficient data to assess *Bossiaea fragrans* against this criterion.

Criterion B Geographic range

Assessment Outcome: Critically Endangered under Criterion B1ab(v) + B2ab(v).

Justification: *Bossiaea fragrans* has a highly restricted geographic distribution, with an extent of occurrence (EOO) estimated to be 4-8 km². (EOO is reported as equal to AOO, despite the range of the species measured with minimum convex hull polygon being less than AOO, to ensure consistency with the definition of AOO as an area within EOO, following IUCN Guidelines (2016).) The new plants discovered from 2011 to 2014 (Jowett 2015) have contributed to an increase in the estimate of EOO, compared to the assessment in 2009 (NSW Scientific Committee 2009). To be listed as Critically Endangered under Criterion B1 a species must have an EOO of <100 km². *Bossiaea fragrans* meets the EOO threshold for Critically Endangered under Criterion B1. The area of occupancy (AOO) for *Bossiaea fragrans* was estimated to be 4-8 km², using a 2 x 2 km grid, as recommended by IUCN (2016). To be listed as Critically Endangered under Criterion B2 a species must have an AOO of <10 km². *Bossiaea fragrans* meets the AOO threshold for Critically Endangered under Criterion B2. In addition to these thresholds, at least two of three other conditions must be met. These conditions are:

- a) The population or habitat is observed or inferred to be severely fragmented or number of locations equals one (for Critically Endangered).

Assessment Outcome: Subcriterion met at Critically Endangered threshold.

Justification: *Bossiaea fragrans* is found at one location. This definition of location is based on the potential scale of the impacts of goats (grazing, browsing, trampling), the most serious plausible threat. *Bossiaea fragrans* meets the number of locations threshold for Critically Endangered B1a+2a. It is currently not known whether the species is severely fragmented.

- 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

Assessment Outcome: Subcriterion met.

Justification: (v) Continuing decline has been observed for number of mature individuals. The NSW Scientific Committee (2009) state "Goats are common in the Abercrombie Caves area and it is thought that they may be grazing on *B. fragrans* seedlings (McDougall pers. comm.)." Some plants have been severely damaged by goat grazing (A. Jowett pers comm, January 2017). Some plants have also been damaged and killed as a result of disturbance and trampling by goats and pigs (A. Jowett pers comm, January 2017). Management of this threat is ongoing: a monitoring program has been established to determine the impact of goat grazing; goat control is ongoing; and there is work underway to establish an electric fence around half the population at the largest monitoring site (A. Jowett pers comm, January 2017). Interestingly, the site with the most seedling recruitment is also characterised by a high level of goat/pig disturbance (A. Jowett pers comm, January 2017). A potential contributor to future decline in *Bossiaea fragrans* is the loss of seed to predation by insects. Observations in 2011 suggested seed predation was significant (in the order of 50%; R. Johnston pers comm, January 2017). However, the impact of seed predation on long-term population dynamics of *Bossiaea fragrans* remains unknown and high levels of seed losses to seed predators in Fabaceae is not uncommon (Auld 1983).

- c) Extreme fluctuations.

Assessment Outcome: Data Deficient.

Justification: Currently there is no available data to assess the likelihood of extreme fluctuations in *Bossiaea fragrans*.

Criterion C Small population size and decline

Assessment Outcome: Endangered under C2a(ii)

Justification: According to Jowett (2015) "Following targeted searches over 3 years from 2011 to 2014, the known population has increased to over 400 plants". To be listed as Critically Endangered under Criterion C a species must have <250 mature individuals, to be listed as Endangered a species must have <2500 mature individuals. *Bossiaea fragrans* meets the total population threshold for listing as Endangered under Criterion C as the population has 400 mature plants.

At least one of two additional conditions must be met. These are:

- C1. An observed, estimated or projected continuing decline of at least 20% in 5 years or 2 generations up to a maximum of 100 years in future (for Endangered).

Assessment Outcome: Data Deficient.

Justification: There is insufficient data to assess *Bossiaea fragrans* against this criterion.

- C2. An observed, estimated, projected or inferred continuing decline.

Assessment Outcome: Subcriterion met.

Justification: Continuing decline has been observed for number of mature individuals. The NSW Scientific Committee (2009) state "Goats are common in the Abercrombie Caves area and it is thought that they may be grazing on *B. fragrans* seedlings (McDougall pers. comm.)." Some plants have been severely damaged by goat grazing (A. Jowett pers comm, January 2017). Plants have also been damaged and killed as a result of disturbance and trampling by goats and pigs (A. Jowett pers comm, January 2017). Management of this threat is ongoing: a monitoring program has been established to determine the impact of goat grazing; goat control is ongoing; and there is work underway to establish an electric fence around half the population (A. Jowett pers comm, January 2017). Interestingly, the site with the most seedling recruitment is also characterised by a high level of goat/pig disturbance (A. Jowett pers comm, January 2017). A potential

contributor to future decline in *Bossiaea fragrans* is the loss of seed to predation by insects. Observations in 2011 suggested seed predation was significant (in the order of 50%; R. Johnston pers comm, January 2017). However, the impact of seed predation on long-term population dynamics of *Bossiaea fragrans* remains unknown and high levels of seed losses to seed predators in Fabaceae is not uncommon.

In addition, at least 1 of the following 3 conditions:

- a (i). Number of mature individuals in each subpopulation ≤ 50 ; ≤ 250 or ≤ 1000 .
Assessment Outcome: Subcriterion met at Vulnerable threshold (≤ 1000).
Justification: Treating the total population of *Bossiaea fragrans* as equivalent to a sub-population (based on their presence at a single location, and the assumption that they therefore have the capacity to undergo genetic exchange), then the species meets the number of mature individuals threshold for listing as Vulnerable under Criterion C2a(i).
- a (ii). % of mature individuals in one subpopulation = 100%
Assessment Outcome: Subcriterion met.
Justification: 100% of mature individuals exist in one subpopulation and *Bossiaea fragrans* meets the threshold for listing as Endangered under Criterion C2a(i).
- b. Extreme fluctuations in the number of mature individuals
Assessment Outcome: Data Deficient.
Justification: Currently there is no available data to assess the likelihood of extreme fluctuations in *Bossiaea fragrans*.

Criterion D Very small or restricted population

Assessment Outcome: Vulnerable under Criterion D1

Justification: The total number of individuals of *Bossiaea fragrans* is estimated to be 400 mature individuals.

To be listed as Vulnerable, a species must meet at least one of the two following conditions:

D1. Population size estimated at <50 , <250 or $<1,000$ mature individuals.

Assessment Outcome: Criterion met at Vulnerable threshold (<1000).

Justification: The total number of individuals of *Bossiaea fragrans* is estimated to be 400 mature individuals (A. Jowett pers comm, December 2016).

D2. Restricted area of occupancy or number of locations with a plausible future threat that could drive the taxon to CR or EX in a very short time.

Assessment Outcome: Criterion met at Vulnerable threshold.

Justification: *Bossiaea fragrans* has an AOO of 4-8 km² and occurs at only one location.

Criterion E Quantitative Analysis

Assessment outcome: Data Deficient.

Justification: Currently there is not enough data to undertake a quantitative analysis to determine the extinction probability of *Bossiaea fragrans*.

Description

The NSW Scientific Committee (2009) state that “*Bossiaea fragrans* K.L.McDougall (Fabaceae) is a recently described species (McDougall 2009). *Bossiaea fragrans* was previously included within *B. bracteosa sens. lat.*, a widespread taxon occurring on the central and southern tablelands and south coast of NSW, and in Victoria and South Australia (James and Harden 2002; McDougall 2009). Recent taxonomic research (McDougall 2009) has resulted in *Bossiaea bracteosa* being split into a number of new species, three of which are in NSW. *B. bracteosa sens. strict.* is now regarded as being a Victorian endemic. *Bossiaea fragrans* is the most northern taxon of those previously included within *B. bracteosa sens. lat.*”

Thompson (2012) revised the *Bossiaea* of eastern Australia and provided a description of *Bossiaea fragrans*, which includes some details not recorded McDougall (2009). Thompson (2012) states that *B. fragrans* is an “Erect rhizomatous leafless shrubs to c. 2.5 m high, with cladodes to c. 20 mm wide, with inflorescences borne on both long and short branchlets, but not generally on a regular series of short side-branchlets; inflorescence bearing cladodes erecto-patent, mostly 5–10 mm wide, with recession at nodes 0.5–1 mm deep, glabrous; marginal ridges well-defined, minutely uneven or tuberculate; new growth somewhat elliptic in profile, sparsely hairy on margins; epicuticular wax developing, lifting in small flakes, with cladodes typically greyish at flowering. Scales 1–2.5 mm long, 0.3–0.7 mm wide from midrib to margin, coppery-brown, obscurely few nerved. Inflorescences: axes contracted; scales 4 or 6, with largest c. 1 mm long, 0.7–1 mm wide, with scale-cluster 1–1.5 mm long; bract caducous or persistent, 1–1.3 mm long, 0.8 mm wide, moderately convex; pedicel 1–2.5 mm long, glabrous; bracteoles caducous before or after anthesis, oblong-elliptic, 1–1.3 mm long, with l:w ratio c. 2, divergent, inserted near base, strongly convex, with venation obscure, glabrous, orange-brown. Calyx 3–4.5 mm long, glabrous, with tube much longer than lobes; upper lobes 0.8–1 mm long, 1.2–1.6 mm wide, not or hardly expanded beyond lateral angle; lateral angle acute; sinus 0.5–0.8 mm deep; lower lobes 0.7–1 mm long, not or hardly chartaceous distally; lateral lobes 0.8 mm wide, ±flat but with a medial ridge; median lobe similar to laterals; standard to c. 12 mm long, similar in length to wings and keel, adaxially yellow with red marks at sides of throat, abaxially yellow, sometimes with a red medial stripe; wings 2.5–3 mm wide, yellow; keel c. 3 mm wide, ±red throughout; anthers c. 0.5 mm long post-dehiscence; ovary glabrous, 5- or 6-ovulate; style 2.5–4 mm long. Pods: (based on McDougall 2010) stipe 2.5–3.5 mm long; body narrow-oblong, 24–38 mm long, 8–10 mm wide, glabrous. Seeds c. 3 mm long, c. 2 mm wide; aril not seen mature.”

Mc Dougall (2009) states that “Flowering: September–October. Fruits dehisce: by December.”

“*Bossiaea fragrans* is morphologically most similar to *B. milesiae* K.L. McDougall, which is confined to the Brogo River catchment near Bega, but *B. fragrans* has ‘broader, glaucous cladode branches, longer corollas and darker coloured standards’ (McDougall 2009). In addition, the two species occupy different habitat (McDougall 2009).”

Distribution

Additional *Bossiaea fragrans* individuals have been discovered since the assessment of the species in 2009. Surveys from 2011 to 2014 identified 400 plants at “21 sites”, a considerable increase on the 13 plants at two sites previously recorded. Nevertheless, the species is still considered to be highly geographically restricted (Jowett 2015). The range of the species is approximately 1 km² and all sites are considered to be part of the one population.

The NSW Scientific Committee (2009) stated that “*Bossiaea fragrans* is currently only known from the Abercrombie Caves area, south of Bathurst on the NSW central tablelands. *B. fragrans* is very highly restricted, as only two sites, 1.5 km apart, are currently known to support extant occurrences and the species has apparently disappeared recently from a third nearby site. The extent of occurrence and area of occupancy were estimated to be 4–8 km², based on 2 x 2 km grid, the spatial scale of assessment recommended by IUCN (2008). The populations occur just within the boundary of the South Western Slopes Bioregion, though the species may also occur in the South Eastern Highlands Bioregion (*sensu* Thackway and Creswell 1995).”

“The two extant occurrences of *Bossiaea fragrans* are located within the Abercrombie Karst Conservation Area, a conservation reserve managed by NSW National Parks and Wildlife Service ... *B. fragrans* was first collected in this area in 1955, and the scarcity of herbarium collections of this taxon suggests that it may have been historically rare and restricted in its occurrence (National Herbarium of NSW records). Recent searches of suitable habitat in the Abercrombie Karst

Conservation Area have not led to the discovery of any further populations. Aerial photographs of the surrounding areas indicate there are some large wooded remnants in the vicinity of Abercrombie Caves, but the landscape is generally cleared and modified for farming (McDougall pers. comm. March 2008)."

Ecology

NSW Scientific Committee (2009) state that "The plants occur within an open White Box (*Eucalyptus albens*) Woodland on slate and volcanic substrates."

"There may be a seedbank present in the soil at all three sites as *Bossiaea* species typically have a long-lived seedbank that responds to fire (Auld pers. comm. May 2008). However, there are thought to have been no fires in the area since 1939 (McDougall pers. comm.) and recent observations suggest that seed predation is significant. The seedbank may therefore be of limited size and viability. Seedling recruitment in the interfire intervals is likely to be limited (Auld pers. comm. May 2008), and seedlings may be subject to grazing."

Threats

Camera traps have been installed to investigate grazing and browsing threats to *Bossiaea fragrans*, and have shown that feral goats, as well as eastern grey kangaroos, swamp wallabies and deer use the area (Jowett 2015).

NSW Scientific Committee (2009) state that "*Bossiaea fragrans* is threatened by grazing and competition from weeds. Goats are common in the Abercrombie Caves area and it is thought that they may be grazing on *B. fragrans* seedlings (McDougall pers. comm.). The grass Serrated Tussock (*Nassella trichotoma*) is also in the area and may be a threat to recruitment of seedlings (McDougall 2009). Serrated Tussock forms large tussocks and mature plants droop across the ground smothering other plants (DECC 2008)."

NSW Scientific Committee (2009) state that "*Bossiaea fragrans* is threatened by environmental and demographic stochasticity due to its very highly restricted distribution and small population size. As a result of the abovementioned threats, *B. fragrans* is at risk of a projected decline in abundance, geographic distribution or habitat quality."

Conservation and Management Actions

There is a NSW Saving Our Species site-managed program for *Bossiaea fragrans*. The following actions are derived from this program:

Habitat loss, disturbance and modification

- Maintain and improve habitat quality.
 - Restrict vehicle use of the area where the species occurs.
 - Prevent grazing and browsing of the species by feral animals (e.g. goats, rabbits).
 - Control feral animals and maintain densities at low levels
 - Prevent grazing and browsing of the species by domestic stock (e.g. sheep, cattle).
 - Encourage walkers and horse riders to use tracks that do not pass through the population or habitat of *Bossiaea fragrans* (e.g. signage, fencing, alternative tracks).
- Avoid damage to *Bossiaea fragrans* plants.
 - Restrict vehicle use of the area where the species occurs.
 - Prevent grazing and browsing of the species by feral animals (e.g. goats, rabbits).
 - Control feral animals and maintain densities at low levels
 - Prevent grazing and browsing of the species by domestic stock (e.g. sheep, cattle).

- Encourage walkers and horse riders to use tracks that do not pass through the population or habitat of *Bossiaea fragrans* (e.g. signage, fencing, alternative tracks).
- Reduce weeds and maintain at low levels (see Invasive species below).

Invasive species

- Reduce and maintain weeds at low levels, particularly *Nassella trichotoma* and *Rubus fruticosus* agg.
- Prevent grazing and browsing of the *Bossiaea fragrans* by feral animals (e.g. goats, rabbits) by controlling these species (localized removal or reduce to low density and maintain at low levels), or fencing.

Ex situ conservation

- Develop a targeted seed collection program for ex situ seed banking.
- Consider growing a living collection of *Bossiaea fragrans*, with the potential to produce seed to supplement the wild population (if required, in response to seed predation).

Stakeholder Management

- Ensure land owners, managers and users of the area where *Bossiaea fragrans* occurs are aware of the subpopulations and the importance of not damaging the plants or their habitat. Work with these groups on options for conservation management and protection of the species.
- Consider erecting signage to raise awareness of the presence of a threatened species.
- Consider erecting fencing to prevent damage to *Bossiaea fragrans* by walkers, horses, and vehicles.

Survey and Monitoring priorities

- Monitor *Bossiaea fragrans* population regularly to determine changes (i.e., increases or decreases in numbers of plants, new recruitment via germination).
- Monitor habitat quality (e.g., weed cover, soil disturbance) and impacts of grazers and browsers on plant growth, reproduction and survival.

Information and Research priorities

- What is the genetic diversity of the population? Does it vary among “clumps” of plants? Were some clumps produced vegetatively, and are clones?
- What is the impact of seed predation on *Bossiaea fragrans* population dynamics? How many (what proportion) of seeds are taken? What species are the main seed predators (likely *Plesiorhinus*; Auld 1989)? How does this vary from year to year and in comparison to other *Bossiaea* species studies or other legumes? Can fruit bagging be used to enhance seed production?
- What is the response of *Bossiaea fragrans* to fire? Does the species resprout? Is it an obligate seeder?
- What are the drivers of seed production in *Bossiaea fragrans*? What causes some plants to produce large numbers of seeds? What are the drivers of *Bossiaea fragrans* seed germination? How is seed germination influenced by variation in temperature and moisture? How does soil disturbance influence seed germination?

References

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Bossiaea fragrans - critically endangered species listing

NSW Scientific Committee - final determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the shrub *Bossiaea fragrans* K.L.McDougall as a critically endangered species in Part 1 of Schedule 1A of the Act. Listing of Critically Endangered species is provided for by Part 2 of the Act.

Note: The Scientific Committee placed a preliminary determination for this species on public exhibition under its former name: *Bossiaea* sp. Abercrombie (K.L. McDougall 1268).

The Scientific Committee has found that:

1. *Bossiaea fragrans* K.L.McDougall (Fabaceae) is a recently described species (McDougall 2009). *Bossiaea fragrans* was previously included within *B. bracteosa* sens. lat., a widespread taxon occurring on the central and southern tablelands and south coast of NSW, and in Victoria and South Australia (James and Harden 2002; McDougall 2009). Recent taxonomic research (McDougall 2009) has resulted in *Bossiaea bracteosa* being split into a number of new species, three of which are in NSW. *B. bracteosa* sens. strict. is now regarded as being a Victorian endemic. *Bossiaea fragrans* is the most northern taxon of those previously included within *B. bracteosa* sens. lat.
2. *Bossiaea fragrans* is an 'erect shrub 1–2.5 m high. Cladodes flattened, winged, becoming round or oval in cross-section but retaining remnants of wings; reproductive branches of cladodes glaucous green, oblong-linear to narrowly oblanceolate or irregular, (6–)8–14 mm wide, winged, glabrous apart from minute hairs in the axils of the scale leaves, becoming incised at the nodes. Leaf scales 1.5–1.9 mm long, dark brown, glabrous apart from marginal cilia. Flowers 1(–6) per node; pedicels 2.5–3 mm long, glabrous, exceeding persistent floral bracts by 1–2 mm at anthesis. Floral bracts imbricate, narrowly ovate, increasing in size from outer to inner, the largest of the persistent bracts c. 1.5 mm long with an acute apex, glabrous apart from marginal hairs, especially towards the apex, chestnut brown, all

but a few bracts caducous prior to anthesis. *Bracteoles* caducous but rarely one or both present at anthesis. *Calyx* glabrous apart from hairs on the margins and inner surface of the lobes apically, green, 4.5–5 mm long; lobes c. 1 mm long, the 2 upper lobes c. 1.5 mm wide, rounded-truncate with acute, diverging apices, the lower 3 triangular, c. 1 mm wide, with acute apices. Corolla with standard 10.5–12 mm long including a claw 3–4 mm long, 12.5–15 mm wide, exceeding other petals, yellow internally and heavily tinged with red externally, with red basal markings and red longitudinal striations radiating from the base to the edge of the lamina; wings 10–11 mm long including a claw 3–4 mm long, yellow, with red markings near base and occasionally extending to edge of lamina, glabrous; keel 10–11 mm long including a claw 3–4 mm long, dark red, glabrous. *Ovary* 5.5–6 mm long, 5–6-ovulate, glabrous; style 2.5–4 mm long. *Staminal filaments* 4–5 mm long, red; sheath 4–5 mm long, red. *Pods* oblong, 2.4–3.8 cm long, 0.8–1 cm wide, glabrous, dark green with reddish-brown markings when mature; stipe 2.5–3 mm long. *Seeds* elliptic to sub-reniform, 3.0–3.2 mm long, 1.8–2 mm wide, dark brown. Flowering: September–October. Fruits dehisce: by December.’ (McDougall 2009).

3. *Bossiaea fragrans* is morphologically most similar to *B. milesiae* K.L. McDougall, which is confined to the Brogo River catchment near Bega, but *B. fragrans* has ‘broader, glaucous cladode branches, longer corollas and darker coloured standards’ (McDougall 2009). In addition, the two species occupy different habitat (McDougall 2009).

4. *Bossiaea fragrans* is currently only known from the Abercrombie Caves area, south of Bathurst on the NSW central tablelands. *B. fragrans* is very highly restricted, as only two sites, 1.5 km apart, are currently known to support extant occurrences and the species has apparently disappeared recently from a third nearby site. The extent of occurrence and area of occupancy were estimated to be 4–8 km², based on 2 x 2 km grid, the spatial scale of assessment recommended by IUCN (2008). The populations occur just within the boundary of the South Western Slopes Bioregion, though the species may also occur in the South Eastern Highlands Bioregion (*sensu* Thackway and Creswell 1995).

5. The two extant occurrences of *Bossiaea fragrans* are located within the Abercrombie Karst Conservation Area, a conservation reserve managed by NSW National Parks and Wildlife Service. The plants occur within an open White Box (*Eucalyptus albens*) Woodland on slate and volcanic substrates. *B. fragrans* was first collected in this area in 1955, and the scarcity of herbarium collections of this taxon suggests that it may have been historically rare and restricted in its occurrence (National Herbarium of NSW records). Recent searches of suitable habitat in the Abercrombie Karst Conservation Area have not led to the discovery of any further populations. Aerial photographs of the surrounding areas indicate there are some large wooded remnants in the vicinity of Abercrombie Caves, but the landscape is generally cleared and modified for farming (McDougall pers. comm. March 2008).

6. The number of mature individuals of *Bossiaea fragrans* is extremely low. Recent searches have located a total of 13 plants within the two extant populations (12 plants at one site, and only one plant at the second site, although a persistent seed bank may be present in the soil). A third site with two plants was recorded in 2003, but the species could not be found at the same location in 2005 (McDougall pers.

comm.). There may be a seedbank present in the soil at all three sites as *Bossiaea* species typically have a long-lived seedbank that responds to fire (Auld pers. comm. May 2008). However, there are thought to have been no fires in the area since 1939 (McDougall pers. comm.) and recent observations suggest that seed predation is significant. The seedbank may therefore be of limited size and viability. Seedling recruitment in the interfire intervals is likely to be limited (Auld pers. comm. May 2008), and seedlings may be subject to grazing.

7. *Bossiaea fragrans* is threatened by grazing and competition from weeds. Goats are common in the Abercrombie Caves area and it is thought that they may be grazing on *B. fragrans* seedlings (McDougall pers. comm.). 'Competition and habitat degradation by Feral Goats, *Capra hircus* Linnaeus 1758' is listed as a Key Threatening Process under the *Threatened Species Conservation Act* 1995. The grass Serrated Tussock (*Nassella trichotoma*) is also in the area and may be a threat to recruitment of seedlings (McDougall 2009). Serrated Tussock forms large tussocks and mature plants droop across the ground smothering other plants (DECC 2008). 'Invasion of native plant communities by exotic perennial grasses' is listed as a Key Threatening Process under the *Threatened Species Conservation Act* 1995.

8. *Bossiaea fragrans* is threatened by environmental and demographic stochasticity due to its very highly restricted distribution and small population size. As a result of the above mentioned threats, *B. fragrans* is at risk of a projected decline in abundance, geographic distribution or habitat quality.

9. *Bossiaea fragrans* K.L. McDougall is eligible to be listed as a Critically Endangered species as, in the opinion of the Scientific Committee, it is facing an extremely high risk of extinction in New South Wales in the immediate future as determined in accordance with the following criteria as prescribed by the *Threatened Species Conservation Regulation* 2002:

Clause 15

The geographic distribution of the species is estimated or inferred to be:

(a) very highly restricted,

and:

(d) a projected or continuing decline is observed, estimated or inferred in:

(i) an index of abundance appropriate to the taxon

(ii) geographic distribution, habitat quality or diversity, or genetic diversity;

(e) and the following conditions apply:

(i) the population or habitat is observed or inferred to be severely fragmented;

(ii) all or nearly all mature individuals are observed or inferred to occur within a small number of populations or locations.

Clause 16

The estimated total number of mature individuals of the species is:

(a) very low,

and:

(d) a projected or continuing decline is observed, estimated or inferred in either:

(i) an index of abundance appropriate to the taxon

(ii) geographic distribution, habitat quality or diversity, or genetic diversity;

(e) and the following conditions apply:

- (i) the population or habitat is observed or inferred to be severely fragmented;
- (ii) all or nearly all mature individuals are observed or inferred to occur within a small number of populations or locations.

Clause 17

The total number of mature individuals of the species is observed, estimated or inferred to be:

- (a) extremely low.

Dr Richard Major

Chairperson

Scientific Committee

Proposed Gazettal date: 11/12/09

Exhibition period: 11/12/09 – 29/01/10

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