



Consultation Document on Listing Eligibility and Conservation Actions

Bossiaea peninsularis (sword bossiaea)

You are invited to provide your views and supporting reasons related to:

- 1) the eligibility of *Bossiaea peninsularis* (sword bossiaea) for inclusion on the EPBC Act threatened species list in the Endangered category; and
- 2) the necessary conservation actions for the above species.

Evidence provided by experts, stakeholders and the general public are welcome. Responses can be provided by any interested person.

Anyone may nominate a native species, ecological community or threatening process for listing under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) or for a transfer of an item already on the list to a new listing category. The Threatened Species Scientific Committee (the Committee) undertakes the assessment of species to determine eligibility for inclusion in the list of threatened species and provides its recommendation to the Australian Government Minister for the Environment.

Draft information for your consideration of the eligibility of this species for listing as Endangered starts at page 3 and information associated with potential conservation actions for this species starts at page 7. To assist with the Committee's assessment, the Committee has identified a series of specific questions on which it seeks your guidance at page 9.

Responses are to be provided in writing either by email to:
species.consultation@environment.gov.au

or by mail to:

The Director
Terrestrial Species Conservation Section
Wildlife, Heritage and Marine Division
Department of the Environment
PO Box 787
Canberra ACT 2601

Responses are required to be submitted by 27 May 2016.

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General background information about listing threatened species

The Australian Government helps protect species at risk of extinction by listing them as threatened under Part 13 of the EPBC Act. Once listed under the EPBC Act, the species becomes a Matter of National Environmental Significance (MNES) and must be protected from significant impacts through the assessment and approval provisions of the EPBC Act. More information about threatened species is available on the department's website at:

<http://www.environment.gov.au/biodiversity/threatened/index.html>.

Public nominations to list threatened species under the EPBC Act are received annually by the department. In order to determine if a species is eligible for listing as threatened under the EPBC Act, the Threatened Species Scientific Committee (the Committee) undertakes a rigorous scientific assessment of its status to determine if the species is eligible for listing against a set of criteria. These criteria are available on the Department's website at:

<http://www.environment.gov.au/biodiversity/threatened/pubs/guidelines-species.pdf>.

As part of the assessment process, the Committee consults with the public and stakeholders to obtain specific details about the species, as well as advice on what conservation actions might be appropriate. Information provided through the consultation process is considered by the Committee in its assessment. The Committee provides its advice on the assessment (together with comments received) to the Minister regarding the eligibility of the species for listing under a particular category and what conservation actions might be appropriate. The Minister decides to add, or not to add, the species to the list of threatened species under the EPBC Act. More detailed information about the listing process is at:

<http://www.environment.gov.au/biodiversity/threatened/nominations.html>.

To promote the recovery of listed threatened species and ecological communities, conservation advices and where required, recovery plans are made or adopted in accordance with Part 13 of the EPBC Act. Conservation advices provide guidance at the time of listing on known threats and priority recovery actions that can be undertaken at a local and regional level. Recovery plans describe key threats and identify specific recovery actions that can be undertaken to enable recovery activities to occur within a planned and logical national framework. Information about recovery plans is available on the department's website at:

<http://www.environment.gov.au/biodiversity/threatened/recovery.html>.

Information about this consultation process

Responses to this consultation can be provided electronically or in hard copy to the contact addresses provided on Page 1. All responses received will be provided in full to the Committee and then to the Australian Government Minister for the Environment.

In providing comments, please provide references to published data where possible. Should the Committee use the information you provide in formulating its advice, the information will be attributed to you and referenced as a 'personal communication' unless you provide references or otherwise attribute this information (please specify if your organisation requires that this information is attributed to your organisation instead of yourself). The final advice by the Committee will be published on the department's website following the listing decision by the Minister.

Information provided through consultation may be subject to freedom of information legislation and court processes. It is also important to note that under the EPBC Act, the deliberations and recommendations of the Committee are confidential until the Minister has made a final decision on the nomination, unless otherwise determined by the Minister.

Bossiaea peninsularis

sword bossiaea

Taxonomy

Conventionally accepted as *Bossiaea peninsularis* I.R. Thompson.

Species Information

Description

Bossiaea peninsularis (sword bossiaea) was split from *Bossiaea ensata* in 2012 (Thompson, 2012). *Bossiaea ensata* occurs in south-eastern Queensland, New South Wales and eastern Victoria (Thompson, 2012). *Bossiaea peninsularis* differs from *Bossiaea ensata* by having distally inserted, more striate and less fleshy bracts and bracteoles; slightly longer cladode-scales with the base more sharply delineated; and the adjacent cladode margin is moderately hairy (Thompson, 2012).

The sword bossiaea is in the family Fabaceae and is an erect or procumbent shrub up to 1 m tall with glabrous flattened and winged stems, with the leaves reduced to small scales. The sword bossiaea flowers mainly in October and the flowers are yellow pea flowers with small red markings (Te et al., 2009). The sword bossiaea is clonal and pods with viable seeds are produced sporadically and depend on good rainfall (Te pers. com., 2015). Not all plants will set seeds (South Australian Seed Conservation Centre, 2015).

Distribution

The sword bossiaea is endemic to the Eyre Peninsula in South Australia. The sword bossiaea occurs on sandy soils surrounding salt marshes and lakes near Lake Brimpton and Karkoo on Eyre Peninsula in South Australia (Te et al., 2009). The species is currently only known from two roadside populations in the vicinity of Karkoo on the southern Eyre Peninsula (Council of Heads of Australian Botanic Gardens, 2014). The land tenure where the species occurs is roadsides and a rail corridor. This species is not known to occur in any conservation reserves.

Relevant Biology/Ecology

The sword bossiaea occurs on sandy soils commonly growing with *Melaleuca uncinata* (broom bush), *Eucalyptus incrassata* (ridge-fruited mallee), and *Dianella revoluta* (blueberry lily). Other associated species include *Melaleuca decussata* (totem-poles), *Calytrix tetragona* (common fringe-myrtle), *Gahnia trifida* (a sword grass) and *Rhagodia* sp. (saltbush). Additionally the sword bossiaea has been recorded growing on a calcrete rise with *Eucalyptus diversifolia* (soap mallee), *Babingtonia behrii* (broom baeckea) and *Melaleuca uncinata* (broom honey-myrtle) (Te et al., 2009).

The sword bossiaea appears to be restricted to the sandy mallee rises surrounding salt lakes and salt marshes. At one location, the vegetation where the sword bossiaea occurs is around the salt lakes grades from samphire plant communities to small remnant pockets of totem-poles, *Melaleuca brevifolia* (mallee honey-myrtle) and *Gahnia trifida* through to sandy rises with ridge-fruited mallee trees and broom honey-myrtle shrubs (Te et al., 2009).

This species reproduces clonally via vegetative 'suckering' (Duval pers. comm., 2016).

Pods with viable seeds are produced sporadically and depend on good rainfall. Not all plants will set seeds (South Australian Seed Conservation Centre, 2015).

Threats

Threats to the species include weeds, roadside spraying, clearing, roadworks, 'borrow pits' and salinity (Te et al., 2009; Te pers. com., 2015).

A number of introduced plant species such as boxthorn (*Lycium ferocissimum*), boneseed (*Chrysanthemoides monilifera*) and bridal creeper (*Asparagus asparagoides*) threaten the sword bossiaea (Te et al., 2009).

Most of the vegetation around the edges of salt lakes and salt marshes in the region where the sword bossiaea occurs has been cleared for cropping. Hence the sword bossiaea populations are restricted to remnant roadside vegetation and a rail corridor. The populations in remnant roadside vegetation are poorly conserved and in some instances impacted upon by roadworks and 'borrow pits' (Te et al., 2009).

The habitat of the sword bossiaea may have originally been surrounded by brackish swamps and lakes, which may have become more salinised as a result of more recent vegetation clearance. Dead and dying vegetation has been observed along the edges of these salt lakes and samphire salt marshes and it is suspected that areas affected by salinisation in this region are increasing. The expansion of salt-affected areas will threaten this species (Te et al., 2009).

Assessment of available information in relation to the EPBC Act Criteria and Regulations

Criterion 1. Population size reduction (reduction in total numbers)			
Population reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4			
	Critically Endangered Very severe reduction	Endangered Severe reduction	Vulnerable Substantial reduction
A1	≥ 90%	≥ 70%	≥ 50%
A2, A3, A4	≥ 80%	≥ 50%	≥ 30%
<div> <div> 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. </div> <div> based on any of the following </div> <div> (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 </div> </div>			

Evidence:

There are no data available to judge whether the species has undergone, is suspected to have undergone or is likely to undergo a reduction in numbers. Therefore, as the species has not been demonstrated to have met any of the elements of Criterion 1, it is not eligible for listing in any category under this criterion. However, the purpose of this consultation document is to elicit additional information to better understand the species' status. This conclusion should therefore be considered to be tentative at this stage, as it may be changed as a result of responses to this consultation process.

Criterion 2. Geographic distribution as indicators for either extent of occurrence AND/OR area of occupancy			
	Critically Endangered Very restricted	Endangered Restricted	Vulnerable Limited
B1. Extent of occurrence (EOO)	< 100 km ²	< 5,000 km ²	< 20,000 km ²
B2. Area of occupancy (AOO)	< 10 km ²	< 500 km ²	< 2,000 km ²
AND at least 2 of the following 3 conditions indicating distribution is precarious for survival:			
(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:

Based on 2 x 2 km grid cells, the scale recommended for assessing geographic distribution by the IUCN (IUCN, 2014), the species' area of occupancy has been estimated to be 32 km², and the extent of occurrence is estimated to be 300 km², which is restricted (Department of the Environment, 2015). The separate populations are severely fragmented and it can be inferred that there will be continuing decline in area of occupancy; area, extent and quality of habitat; number of subpopulations and number of mature individuals as the threats affecting this species (e.g. weeds, roadside spraying, clearing, roadworks, 'borrow pits' and salinity) have not ceased (Te et al., 2009).

The sword bossiaea appears to be restricted to the sandy mallee rises surrounding salt lakes and salt marshes. Since most of the land around the salt lakes has been cleared for cropping, the remaining populations are restricted to remnant roadside vegetation and a rail corridor (Te et al., 2009). As the natural habitat for this species has been predominantly cleared and the remaining populations occur on roadsides, these patches are small, isolated and severely fragmented. The populations in remnant roadside vegetation are poorly conserved and in some instances impacted upon by roadworks and 'borrow pits'.

The region in which the sword bossiaea occurs may have originally consisted of brackish swamps and lakes, which may have become more salinised as a result of more recent vegetation clearance. Dead and dying vegetation has been observed along the edges of these salt lakes and samphire salt marshes and it is suspected that areas affected by salinisation in this region are increasing.

The sword bossiaea grows on sandy rises surrounding salt marshes/lakes, and the expansion of salt-affected areas will threaten these remnant roadside populations.

The data presented above appear to demonstrate that the species is **eligible for listing as Endangered** under this criterion. However, the purpose of this consultation document is to elicit additional information to better understand the species' status. This conclusion should therefore be considered to be tentative at this stage, as it may be changed as a result of responses to this consultation process.

Criterion 3. Population size and decline			
	Critically Endangered Very low	Endangered Low	Vulnerable Limited
Estimated number of mature individuals	< 250	< 2,500	< 10,000
AND either (C1) or (C2) is true			
C1 An observed, estimated or projected continuing decline of at least (up to a max. of 100 years in future)	Very high rate 25% in 3 years or 1 generation (whichever is longer)	High rate 20% in 5 years or 2 generation (whichever is longer)	Substantial rate 10% in 10 years or 3 generations (whichever is longer)
C2 An observed, estimated, projected or inferred continuing decline AND its geographic distribution is precarious for its survival based on at least 1 of the following 3 conditions:			
(a) (i) Number of mature individuals in each subpopulation	≤ 50	≤ 250	≤ 1,000
(a) (ii) % of mature individuals in one subpopulation =	90 – 100%	95 – 100%	100%
(b) Extreme fluctuations in the number of mature individuals			

Evidence:

Surveys on the Eyre Peninsula in 2008 identified approximately 80 plants and an additional 130 clumps (Te et al., 2009). As this species has a suckering growth habit, it was too difficult to distinguish between an individual and multiple plants growing in a single clump and in most cases one clump was one suckering individual (Duval pers. comm., 2016). As the species reproduces clonally it was assumed that each clump was one mature individual as per the IUCN guidelines (IUCN, 2014). Therefore, the total population figure for this species is estimated to be approximately 210 plants (Duval pers. comm., 2016). Therefore, the estimated total number of mature individuals was assessed to be 'very low' (<250 individuals).

A continuing decline is inferred as the threats described above have not ceased and its geographic distribution is precarious for its survival based on information that 100% of plants observed were mature individuals (Duval pers. comm., 2016).

The data presented above appear to demonstrate that the species is **eligible for listing as Endangered** under this criterion. However, the purpose of this consultation document is to elicit additional information to better understand the species' status. This conclusion should therefore be considered to be tentative at this stage, as it may be changed as a result of responses to this consultation process.

Criterion 4. Number of mature individuals			
	Critically Endangered Extremely low	Endangered Very Low	Vulnerable Low
Number of mature individuals	< 50	< 250	< 1,000

Evidence:

Surveys on the Eyre Peninsula in 2008 identified approximately 80 plants and an additional 130 clumps (Te et al., 2009). As this species has a suckering growth habit, it was too difficult to distinguish between an individual and multiple plants growing in a single clump and in most cases one clump was one suckering individual (Duval pers. comm., 2016). As the species reproduces clonally it was assumed that each clump was one mature individual as per the IUCN guidelines (IUCN, 2014). Therefore, the total population figure for this species is estimated to be approximately 210 plants (Duval pers. comm., 2016). Therefore, the estimated total number of mature individuals was assessed to be 'very low' (<250 individuals).

The data presented above appear to demonstrate that the species is **eligible for listing as Endangered** under this criterion. However, the purpose of this consultation document is to elicit additional information to better understand the species' status. This conclusion should therefore be considered to be tentative at this stage, as it may be changed as a result of responses to this consultation process.

Criterion 5. Quantitative Analysis			
	Critically Endangered Immediate future	Endangered Near future	Vulnerable Medium-term future
Indicating the probability of extinction in the wild to be:	≥ 50% in 10 years or 3 generations, whichever is longer (100 years max.)	≥ 20% in 20 years or 5 generations, whichever is longer (100 years max.)	≥ 10% in 100 years

Evidence:

Population viability analysis appears not to have been undertaken, there are insufficient data to demonstrate if the species is eligible for listing under this criterion. However, the purpose of this consultation document is to elicit additional information to better understand the species' status. This conclusion should therefore be considered to be tentative at this stage, as it may be changed as a result of responses to this consultation process.

Conservation Actions

Recovery Plan

A decision about whether there should be a recovery plan for this species has not yet been determined. The purpose of this consultation document is to elicit additional information to help inform this decision.

Conservation and Management Actions

Primary Conservation Actions

1. Prevent further habitat disturbance and clearing, particularly as a result of roadside and rail maintenance activities.
2. Investigate options for linking and enhancing existing populations or establishing additional populations.
3. Effectively administer the recovery effort.

Conservation and Management Priorities

Habitat loss disturbance and modifications

- Prevent habitat disturbance. Maintain roadside markers at sites where they have been installed and install at new roadside/rail corridor populations where they are not currently installed.

- Ensure staff and contractors responsible for road/rail corridor maintenance works are aware of the species' occurrence and do not undertake activities which would threaten the sword bossiaea.
- Ensure land managers are aware of the species' occurrence and provide protection measures against key and potential threats.
- Continue seed collection, propagation and planting of the sword bossiaea in collaboration with the Australian Seed Bank Partnership, using known protocols to establish ex-situ seed collections that capture genetic representation of the remaining populations as an insurance policy, to aid in re-establishing populations and to increase populations where regeneration is not occurring. The establishment of new populations within conservation reserves would be of particular value.
- Where possible, protect the land where the species occurs through formal conservation agreements.
- Undertake broadscale revegetation of recharge areas to help reduce the impact of salinity in areas where the sword bossiaea occurs.

Invasive species

- Identify and remove known weeds in the local area that are a threat to the sword bossiaea, using appropriate methods. Advice from a council weeds officer should be sought as infestations can be inadvertently spread by inappropriate control activities. It should be noted that the sword bossiaea is adversely affected by roadside spraying.
- Identify and remove new weeds in the local area that could become a threat to the sword bossiaea, using appropriate methods (noting that the sword bossiaea is susceptible to roadside spraying).

Stakeholder Management

- Provide information to stakeholders responsible for road and rail corridor maintenance and roadside weed maintenance programs to ensure that these activities do not detrimentally affect this species.
- Gain agreement from land managers of existing populations to protect the species and install road and rail markers to prevent habitat disturbance.

Survey and Monitoring priorities

- Support and enhance the existing monitoring program.
- Undertake survey work in suitable habitat and potential habitat to locate any additional occurrences to more precisely assess population size and distribution.
- Monitor the progress of recovery, including the effectiveness of management actions and the need to adapt them if necessary.

Information and research priorities

- More precisely assess the relative impacts of threatening processes by designing and implementing a monitoring program to obtain and clarify baselines for future reference of change.
- Investigate options for linking, enhancing or establishing additional populations.
- Continue to support the ex-situ seed storage.

Collective list of questions – your views

Population size

1. Do you consider the way the population size has been derived to be appropriate? Are there any assumptions and unquantified biases in the estimates? Did the estimates measure relative or absolute abundance? Do you accept the estimate of the total population size of the species? If not, please provide justification for your response.

If, because of uncertainty, you are unable to provide a single number, you may wish to provide an estimated range. If so, please choose one of the ranges suggested in the table below of possible species numbers, and also choose the level of confidence you have in this estimate:

Number of mature individuals is estimated to be in the range of:				
<input type="checkbox"/> 1–50	<input type="checkbox"/> 51–250	<input type="checkbox"/> 251–1000	<input type="checkbox"/> >1000	<input type="checkbox"/> >10 000
Level of your confidence in this estimate:				
<input type="checkbox"/> 0–30% - low level of certainty/ a bit of a guess/ not much information to go on				
<input type="checkbox"/> 31–50% - more than a guess, some level of supporting evidence				
<input type="checkbox"/> 51–95% - reasonably certain, information suggests this range				
<input type="checkbox"/> 95–100% -high level of certainty, information indicates quantity within this range				
<input type="checkbox"/> 99–100% - very high level of certainty, data are accurate within this range				

2. Please provide (if known) any additional evidence which shows the population is stable, increasing or declining.

Current Distribution/range/extent of occurrence, area of occupancy

3. Do you agree that the way the current extent of occurrence and/or area of occupancy has been estimated is appropriate? Please provide justification for your response.

Can you provide estimates (or if you disagree with the estimates provided, alternative estimates) of the extent of occurrence and/or area of occupancy.

If, because of uncertainty, you are unable to provide an estimate of extent of occurrence, you may wish to provide an estimated range. If so, please choose one of the ranges suggested in the table below of ranges of extent of occurrence, and also choose the level of confidence you have in this estimated range.

Extent of occurrence is estimated to be in the range of:				
<input type="checkbox"/> <100 km ²	<input type="checkbox"/> 100 – 5 000 km ²	<input type="checkbox"/> 5 001 – 20 000 km ²	<input type="checkbox"/> >20 000 km ²	
Level of your confidence in this estimated extent of occurrence				
<input type="checkbox"/> 0–30% - low level of certainty/ a bit of a guess/ not much data to go on				
<input type="checkbox"/> 31–50% - more than a guess, some level of supporting evidence				
<input type="checkbox"/> 51–95% - reasonably certain, data suggests this range of decline				

- ☐ 95–100% -high level of certainty, data indicates a decline within this range
- ☐ 99–100% - very high level of certainty, data is accurate within this range

If, because of uncertainty, you are unable to provide an estimate of area of occupancy, you may wish to provide an estimated range. If so, please choose one of the ranges suggested in the table below of ranges of area of occupancy, and also choose the level of confidence you have in this estimated range.

Area of occupancy is estimated to be in the range of:

- ☐ <10 km² ☐ 11 – 500 km² ☐ 501 – 2000 km² ☐ >2000 km²

Level of your confidence in this estimated extent of occurrence:

- ☐ 0–30% - low level of certainty/ a bit of a guess/ not much data to go on
- ☐ 31–50% - more than a guess, some level of supporting evidence
- ☐ 51–95% - reasonably certain, data suggests this range of decline
- ☐ 95–100% -high level of certainty, data indicates a decline within this range
- ☐ 99–100% - very high level of certainty, data is accurate within this range

General

4. Can you provide additional data or information relevant to this assessment?

Threats

5. Do you agree that the threats listed are correct and that their effect on the species is significant?
6. To what degree are the identified threats likely to impact on the species in the future?
7. Can you provide additional or alternative information on threats, past, current or potential that may adversely affect this species at any stage of its life cycle?
8. Do you know if this species or its habitat is susceptible to fire? Can you provide any suggestions on appropriate fire management strategies for this species?

Management

9. What planning, management and recovery actions are currently in place to support the protection and recovery of this species? To what extent have they been effective?
10. Can you recommend any additional or alternative specific threat abatement or conservation actions that would aid the protection and recovery of this species?
11. What specific research or information is needed to help conserve this species?
12. What individuals or organisations are currently, or potentially could be, involved in the management and recovery of this species?

References cited in the advice

- Department of the Environment (2015). AOO and EOO of the Sword Bossiaea (*Bossiaea peninsularis*). Department of the Environment. Canberra.
- IUCN (2014). Guidelines for using the IUCN Red List Categories and Criteria. Version 11. Prepared by the Standards and Petitions Subcommittee. IUCN. Gland.
- Te T, Duval D, Thorpe M and Ainsley P (2009). Ex situ conservation of threatened South Australian plants, Botanic Gardens of Adelaide, July 2009, Government of South Australia.
- Thompson IR (2012). A revision of eastern Australian Bossiaea (Fabaceae:Bossiaeeae), *Muelleria* 30(2): 106–174.

Other sources cited in the advice

- South Australian Seed Conservation Centre (2015). Seeds of South Australia, South Australian Seed Conservation Centre, Botanic Gardens of South Australia. Available on the Internet at: http://saseedbank.com.au/species_information.php?rid=715
- Council of Heads of Australian Botanic Gardens (2014). Australian Seedbank Partnership. Seed hunting in the Eyre Peninsula. Available on the Internet at: <http://www.seedpartnership.org.au/partners/sa/seedhunter>