

THREATENED SPECIES SCIENTIFIC COMMITTEE

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

The Minister's delegate approved this Conservation Advice on 15/07/2016.

Conservation Advice

Boronia exilis

Scott River boronia

Conservation Status

Boronia exilis (Scott River boronia) is listed as Endangered 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 at that time as, immediately prior to the commencement of the EPBC Act, it was listed as Endangered under Schedule 1 of the *Endangered Species Protection Act 1992* (Cwlth).

Species can also be listed as threatened under state and territory legislation. For information on the 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 Endangered category are that it has a restricted distribution, which is severely fragmented and there is a continuing decline in the quality of habitat and the number of plants as a result of threats such as *Phytophthora* dieback.

Description

The Scott River boronia is an erect slender-stemmed perennial which is approximately 1 m high and has pale pink/white flowers (Wilson 1998). Its upper leaves are slender and almost round in cross-section, to 1.5 cm long (Wilson 1998). The pink flowers are borne in clusters of 3–9 flowers at the end of branches (Wilson 1998). Each flower has four woolly sepals which are deep red and 4 mm long with four broadly ovate pink petals to 7 mm long (Wilson 1998). The name *exilis* is Latin for slender and weak, referring to the stems of the species (Wilson 1998). The Scott River boronia is similar to *B. juncea*, and particularly to the *B. juncea* subsp. *laniflora* (Wilson 1998). It can be distinguished from *B. juncea* by its strongly fringed stamens, which are hairless in *B. juncea* (Wilson 1998).

Distribution

The Scott River boronia only occurs in the Scott River area of south-west Western Australia (Wilson 1998). Surveys in the mid to late 1990's identified six populations of the species with one of these populations having four subpopulations (Luu & English 2004). These populations occur in a variety of land tenure from shire reserves to state forest reserves and one population is found in the Scott National Park. The total population number for the species is estimated to be over 2300 mature individuals (Luu & English 2004). The species occurs in seasonally wet heath or sedgeland on grey silty sand, over ironstone. One population on private land north-east of Augusta occurs in low *Banksia attenuata* (candle banksia), *B. ilicifolia* (holly-leaved banksia) and *Eucalyptus marginata* (jarrah) woodland; mixed *Proteaceae* and *Myrtaceae* scrub; and low sedgeland with patches of low open *Proteaceae* /*Myrtaceae* heath (Williams et al., 2001).

Several populations of the Scott River boronia are located in the 'Scott River Ironstone Association' Endangered ecological community (English & Blyth 1999). The ironstone soils on which the species is found are highly restricted. There is a total of 39 occurrences of this ecological community covering 3.6 km² of the Scott River plain (Gibson et al., 2000). The species' apparent close association with low-lying heath/ sedgeland on restricted ironstone soils suggests that the species is naturally rare (Luu & English 2004).

Relevant Biology/Ecology

Boronia species are likely to be sensitive to waterlogging and diseases that commonly result from waterlogging. The Scott River boronia occurs in an area that is seasonally inundated with water and is likely to be sensitive to *Phytophthora* infection (Shearer, pers. comm., cited in Luu & English 2004). Based on field studies at one location it is likely that the species is killed by fire and it is unlikely that fire stimulates germination (Luu & English 2004). Boronia seeds have an elisasome (an extension from the seed) that is most likely associated with ant dispersal. The species flowers in September (Brown et al., 1998) and the fragrant flowers are likely to be pollinated by moths and other insects as has been observed in many other *Boronia* species (Evans et al., 1999).

Threats

Table 1 – Threats impacting on the Scott River boronia in approximate order of severity of risk, based on available evidence.

Threat factor	Threat type and status	Evidence base
Habitat loss, disturbance and fragmentation		
Road maintenance activities	known current	Road maintenance activities such as grading, chemical spraying, construction of drainage channels and the mowing of roadside vegetation affects several populations of this species. Several of these actions also encourage the establishment of a variety of weeds (Luu & English 2004).
Mining	potential	Mineral exploration and extraction leases occur over the species' habitat (Luu & English 2004).
Commercial wildflower picking	potential	Commercial wildflower picking is known to occur in the Scott River area. As the species is similar to other <i>Boronia</i> species from this region, collectors may inadvertently collect this threatened species (Luu & English 2004).
Changes to hydrology	potential	Due to land clearance in the Scott River catchment the species is at risk of being affected by increased salinity levels and flooding (Land & Water Australia 2001). Conversely, groundwater extraction for agricultural, urban, mining and other purposes may result in the lowering of the water table (Luu & English 2004).
Invasive species		
Weed invasion	known current	Weed invasion is a minor threat to the Brennan Bridge population, due to the close proximity of the population to the road. Weeds suppress early plant growth by competing for light, moisture and nutrients. Weeds also reduce the chance of regeneration from the seed bank and increase fuel loads, potentially exacerbating the fire risk (Evans et al., 1999).

Disease		
Infection by <i>Phytophthora</i> species	potential	Phytophthora dieback is a potential threat to all populations of the Scott River boronia as <i>Phytophthora</i> spp. have been identified in the species' habitat (Luu & English 2004). <i>Phytophthora</i> species, of which <i>Phytophthora cinnamomi</i> is the most widespread and destructive, kill susceptible plants by attacking their root systems, preventing them from taking up the water and nutrients they need (DPAW 2016). The response of the Scott River boronia to <i>Phytophthora</i> is not known, but it is thought to be susceptible to the disease (Shearer pers. comm., cited in Luu & English 2004). The habitat in which the species occurs is highly susceptible to the disease as it has shallow soils and is seasonally inundated with water (Luu & English 2004).
Fire		
High frequency	suspected current	Field surveys suggest that the species is killed by fire and recruitment is not stimulated by fire (Luu & English 2004).
High intensity	suspected current	Following intense fires the soil seed bank may be depleted if fires occur before juvenile plants reach maturity and replenish the soil seed bank (Luu & English 2004).

Conservation Actions

Conservation and Management priorities

Habitat loss disturbance and modifications

- Erect appropriate signage to indicate conservation of individuals or groups of plants. Maintain Declared Rare Flora (DRF) markers¹. Continue producing and distributing dashboard stickers and posters that illustrate DRF markers, inform of their purpose and provide a contact telephone number to use if such a marker is encountered.
- Prevent habitat disturbance by erecting a fence around the species' habitat where mining leases occur over the species' habitat.
- Investigate options with landholders to place covenants or stewardship agreements over land where the species occurs.
- Provide signage in national parks, state forest and reserves to prevent collection of wildflowers or damage to plants in any way.
- Protect and rehabilitate riparian vegetation by completing revegetation at key sites in the Scott River catchment.
- Ensure land managers are aware of the species' occurrence and provide protection measures against key and potential threats.

¹ DRF markers are used in Western Australia and are two standardised yellow markers at either end of a site, which are bent to face towards each other, indicating that DRF plants may occur anywhere between the markers, from the road's running surface to the fence. They alert people working in the vicinity to the presence of DRF, and the need to avoid work that may damage vegetation in the area (DEC 2013).

Invasive species

- Identify and remove any new weeds or undertake weed control in the local area for weeds that could become a threat to the species, using appropriate methods such as hand weeding or localised application of herbicide. Ensure that the overspray associated with any chemical control is minimised.
- All applications of weed control will be followed by a report on the method, timing and success of the treatment against weeds, and the effect on the Scott River boronia and associated native plant species (Luu & English 2004).

Disease

- Monitor the Scott River boronia and nearby plants for the presence of *Phytophthora cinnamomi* and other *Phytophthora* species. If detected, minimise the spread by implementing appropriate vehicle and footwear hygiene protocols where possible, and mitigate impacts with phosphite treatments, fumigants, specific vegetation destruction, and containment barriers (Department of the Environment 2014).
- Implement suitable hygiene protocols (as outlined in CALM 2003) to protect known populations from further outbreaks of *Phytophthora cinnamomi* and other *Phytophthora* species.

Fire

- Fires must be managed to ensure that prevailing fire regimes do not disrupt the life cycle of this threatened species; that they support rather than degrade the habitat necessary to the threatened species; that they do not promote invasion of exotic species; and that they do not increase the impacts of grazing.
- Physical damage to the habitat and individuals of the threatened species must be avoided during and after fire operations.
- Provide maps of known occurrences to local and state Rural Fire Services and seek inclusion of mitigation measures in bush fire risk management plan/s, risk register and/or operation maps.

Breeding, propagation and other exsitu recovery action

- Collect seed for storage by the Western Australian Threatened Flora Seed Centre and cutting material for propagation at Kings Park and Botanic Garden. This material provides insurance against extinction of the species and may be used for future translocations.
- If establishing additional populations in suitable secure habitat, implement the national translocation protocols of Vallee et al., (2004).

Stakeholder Engagement

- Consult with local landowners and managers (including local government agencies, pastoralists and indigenous communities) regarding the presence of the Scott River boronia on their land to promote the conservation of this species and to prevent any populations from being accidentally damaged or destroyed.
- Prepare a management strategy with the input from local experts.
- Land managers (including local government agencies, pastoralists and indigenous communities) should be given information about managing fire for the benefit of the threatened species.

- Promote the conservation of this species in the local community through poster displays and the local print and electronic media. Establish links with local naturalist groups, wildflower societies and interested individuals to further promote the conservation of this species. Produce an information sheet that includes a description of the species, its habitat, threats, recovery actions and photos (Luu & English 2004).

Survey and Monitoring priorities

- Undertake survey work in suitable habitat and potential habitat to locate any additional populations.
- More precisely assess population size, distribution, ecological requirements and the relative impacts of threatening processes.
- Design and implement a monitoring program or, if appropriate, support and enhance existing programs.
- Monitor the progress of recovery, including the effectiveness of management actions and the need to adapt them if necessary.
- Monitor the size and structure and reproductive status of populations at different stages in the fire cycle, taking opportunities to monitor after planned and unplanned fires (where they occur) and improve the understanding of the species' response to fire.
- Precise fire history records must be kept for the habitat and extant populations (confirmed and suspected) of this threatened species.

Information and research priorities

- Improve the understanding of the mechanisms of the species' response to different fire regimes and identify an appropriate fire regime to maximise plant regeneration including the maintenance of a fire-free interval sufficient to reinstate the soil seed bank. This could be achieved by undertaking appropriately designed experiments in the field and/or laboratory.
- Where appropriate, use information and research on fire responses from other *Boronia* species to develop fire management strategies for the conservation of this species.
- Investigate options for linking, enhancing or establishing additional populations.
- Undertake seed germination and vegetative propagation trials to determine the requirements for successful germination and establishment.
- Obtain further information on the biology and ecology of this species. For example, investigate:
 - soil seed bank dynamics and the role of disturbance (including fire), competition, rainfall and grazing on germination and recruitment;
 - the pollination biology of the species;
 - the reproductive strategies, phenology and seasonal growth of the species;
 - the population genetic structure, levels of genetic diversity and minimum viable population size;
 - the impact of salinisation or increased water logging on the Scott River boronia and its habitat; and
 - the impacts of *Phytophthora* dieback disease and control techniques for the Scott River boronia and its habitat (Luu & English 2004).

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