

# 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 01/04/2016.

## Conservation Advice

### *Grevillea maccutcheonii*

McCutcheon's grevillea

#### Conservation Status

*Grevillea maccutcheonii* (McCutcheon's grevillea) is listed as Endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act). The species is eligible for listing as prior to the commencement of the EPBC Act, it was listed as Endangered under Schedule 1 of the *Endangered Species Protection Act 1992* (Cwlth).

The main factors that are the cause of the species being eligible for listing in the Endangered category are its geographic distribution is precarious for its survival due to its restricted and number of locations, and small population size.

*Grevillea maccutcheonii* is listed as Declared Rare Flora and ranked as Critically Endangered under the Western Australian *Wildlife Conservation Act 1950*.

#### Description

McCutcheon's grevillea is a dense, spreading 2 m tall x 3 m wide shrub. It has attractive large red flowers and distinctive, flattened three-lobed leaves that encircle the stem. Flowering has been recorded between May and December, peaking in July to November (Stack et al. 2003; Western Australian Herbarium n.d.). Mature fruits have been found in April and May (Keighery & Cranfield 1996; Makinson 2000; Phillimore & Papenfus 1999).

McCutcheon's grevillea differs from *Grevillea manglesioides* and two other related taxa (*G. diversifolia* and *G. papillosa*) in having panduriform (fiddle-shaped), rigid, stem-clasping leaves and larger flowers (pistil 20–24 mm long versus 6–11 mm in all other members of the species complex). McCutcheon's grevillea also has glabrous (smooth) vegetative and floral parts, with the exception of the margins of the floral bracts (Keighery & Cranfield 1996).

#### Distribution

McCutcheon's grevillea is known from a single location near the base of the Whicher Range, south east of Busselton, in Western Australia (Brown et al. 1998; Keighery & Cranfield 1996).

The extent of occurrence and area of occupancy of this species are less than 42 km<sup>2</sup>. (WA DEC 2007). There are no data to indicate a decline in the extent of occurrence or area of occupancy of this highly restricted species. However, it was probably originally found in a tall mixed shrubland and the extent of occurrence would have exceeded the area in which it is now known to occur (Stack et al. 2003). There are no data to indicate future declines in extent of occurrence. The species' distribution is highly restricted, though not severely fragmented. However, as it is a highly restricted species which only occurs in one known location, a single disturbance event could destroy the entire known species in the wild (WA DEC 2007).

There were four populations in 2007, three in nature reserves managed by the Western Australian Department of Parks and Wildlife (DPAW) for the conservation of flora and fauna and specifically for the management of McCutcheon's grevillea. Of these three populations, two consist of translocated plants. The other population occurs in a road reserve (WA DEC 2007).

The total population size for this species was estimated in 2007 to be approximately seven mature plants. There are additional plants in the translocated populations, however, these have not yet proved to be independently viable (capable of reproducing unassisted), so they are regarded as surviving within a 'nursery' situation (WA DEC 2007).

In 1993, McCutcheon's grevillea was known from 27 plants, five on a road verge and 22 on the adjoining private property. During a survey of the population in September 1994 none of the plants were located on the private property site and the area was being grazed by cattle. The cattle were removed and the land purchased by the then Department of Conservation and Land Management in 1999. Road grading activities in 1995 reduced the population on the road reserve to four mature plants. Sixteen seedlings germinated during 1996–1997, but only ten of these had survived in 1999. In 1999 there were a total of 14 plants and four seedlings in this population (Phillimore & Papenfus 1999) and by 2003 there were 13 mature plants and 20 seedlings (Stack et al. 2003). By June 2005 there were 24 seedlings located at this population, and seven mature plants. During 2004–2005, there were eight to ten new seedlings and an approximate loss of five to six plants due to road maintenance, traffic and natural events (WA DEC 2007).

McCutcheon's grevillea is potentially a disturbance opportunist, as while the known wild population fluctuates in size from time to time, it is largely stable. Although road grading is putting one population at some risk, it is also generating disturbance which promotes seedling germination. These seedlings are moved from the shoulder of the road to avoid being damaged or destroyed by road traffic (WA DEC 2007).

A translocation was undertaken in 2000 with about 300 plants propagated by the Botanic Gardens and Parks Authority (BGPA) from seed and cuttings. BGPA currently holds 15 plants of McCutcheon's grevillea representing five clones. The species has been extremely variable in its propagation success rate, with strike rates ranging from 0% to 100%. This may be partly due to the time of year and quality of collected material but no consistency has yet been determined (A. Shade, pers. comm., cited in Stack et al. 2003). Plants are also cultivated in the National Botanic Garden of Wales (Ammanford News 2013).

Given that this species is known from a very small area, it is considered that all known habitat for the single known and translocated populations are essential for its survival (WA DEC 2007). The wild subpopulations are particularly important as they represent the only known instance in which this species occurs naturally, as well as being a source of plants for translocation in the future.

McCutcheon's grevillea is known to be in cultivation only in the BGPA and several private native gardens. However, its compact habit, beautiful foliage, colourful flowers and extended flowering period would make it an attractive native plant for the nursery trade (Stack et al. 2003).

### **Relevant Biology/Ecology**

McCutcheon's grevillea occurs in perched seasonally inundated wetlands known as the Abba Wet Ironstone Flats, on shallow red sandy clay soils over ironstone. Associated species are a tall shrubland of *Calothamnus quadrifidus*, *Dryandra* sp., *Hakea aff. varia*, *Viminaria juncea* over low shrubs and sedges (Keighery & Cranfield 1996).

McCutcheon's grevillea is located within the shrublands on southern Swan Coastal Plain ironstones ecological community, which is listed as Critically Endangered in Western Australia (English 1999) and Endangered under the EPBC Act. It is also associated with two other EPBC Act listed threatened flora: *Dryandra nivea* subsp. *uliginosa* (Endangered) and *Dryandra squarrosa* subsp. *argillacea* (Vulnerable) (WA DEC 2007).

The species regenerates apparently from seed only (Makinson 2000). It is suspected to be disturbance opportunist and seedlings have germinated on the road reserve in grader spoil (Stack et al. 2003). The life span of McCutcheon's grevillea is unknown but flowering has been noted to occur on plants grown from cuttings within approximately two years (Stack et al. 2003), and seedlings flower within three years in cultivation (WA DEC 2007).

## Threats

Table 1 – Threats

Threat factor	Threat type	Threat status	Evidence base
Habitat loss, disturbance and modifications			
Habitat degradation and fragmentation	known	current	Threatens all populations. The lack of associated native vegetation makes it more likely that pollinators will be infrequent or absent. In addition, the lack of available habitat for recruitment is of concern. Part of the natural population occurs on a narrow road reserve with cleared land beyond.
Road maintenance	known	current	Threatens the road reserve population and its habitat. Associated threats include grading, chemical spraying, construction of drainage channels and the mowing of roadside vegetation. Several of these actions also encourage weed invasion.
Invasive species			
Weeds	known	current	Weed invasion and competition is a major threat to both the natural and translocated populations. Weeds suppress early plant growth by competing for soil moisture, nutrients and light. They also exacerbate grazing pressure and increase the fire hazard due to the high fuel loads that are produced annually by many grass weed species. Narrow linear populations such as road reserves have little buffering, and are severely affected by weed invasion from adjacent cleared land. The translocated populations are being planted into areas previously cleared for agriculture and presently being rehabilitated, and are likely to contain many weed propagules.
Rabbits	known	current	Grazing by rabbits has impacted on McCutcheon's grevillea populations. In addition to direct grazing, rabbits also encourage invasion of weeds through soil digging, addition of nutrients to soil, and introduction of weed seeds. The high level of palatable weeds in the area of populations and in adjacent farming properties attracts herbivorous animals, which are often unselective in their grazing. As the species is a disturbance specialist digging by rabbits may result in seed germination and subsequent grazing of seedlings.
Competition	known	current	There are several competing native species growing with McCutcheon's grevillea the dominant ones being <i>Melaleuca incana</i> , <i>Viminaria juncea</i> , <i>Hakea</i> sp. Williamson, <i>Kunzea</i> aff. <i>micrantha</i> , <i>Loxocarya magna</i> , <i>Juncus microcephalus</i> , <i>Acacia</i> sp. and <i>Banksia nivea</i> subsp. <i>uliginosa</i> .

Disease			
Disease	known	current	<i>Phytophthora cinnamomi</i> is a serious threat to all populations. This plant pathogen causes root rot which may cause the host plant to die of drought stress. McCutcheon's grevillea has been found to be moderately susceptible to dieback caused by cinnamon fungus (C. Crane, pers. comm.).
Fire			
Fire frequency	potential	future	Too frequent fire would impact the viability of populations as seeds of McCutcheon's grevillea are likely to germinate following fire. If this is the case, the soil seed bank would rapidly be depleted if fires recurred before regenerating or juvenile plants reached maturity and replenished the soil seed bank. Fires also generally stimulate the germination of weeds which have infested the habitat of the natural population.

## **Conservation Actions**

### **Conservation and Management priorities**

Habitat loss, disturbance and modifications

- Protect the natural population from habitat loss as a consequence of road upgrades and other developments.
- Prevent habitat disturbance. Maintain fencing to suitably constrain stock and vehicle access to known sites.
- Maintain Declared Rare Flora (DRF) markers<sup>1</sup>. 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.

Invasive species

- Continue weed control in the local area, using appropriate methods such as hand weeding or targeted application of herbicide during the appropriate season to minimise the effect of herbicide on the species and the surrounding native vegetation.
- Manage sites by maintaining fencing, continue to control and reduce the spread of rabbits using appropriate methods such as 1080 poisoned oats, gassing warrens and shooting.
- Prune and monitor non threatened native species growing in competition with McCutcheon's grevillea take measures to reduce competition. Measures may include reduction of canopy cover over individual plants.

Disease

- Continue spraying program using phosphite at all populations to control *Phytophthora cinnamomi*.

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<sup>1</sup> 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).

- Implement and/or continue suitable hygiene protocols (DPaW 2014) to protect known populations from any further outbreaks of *Phytophthora cinnamomi*. These should be adhered to wherever possible for activities such as maintenance of road reserves, and walking into populations in wet soil conditions.

#### Fire

- The species is a post-fire obligate seeder as fire kills the standing plants and the population relies upon post-fire seedling recruitment for its persistence. Implement an appropriate fire management regime based on fire frequencies that promote seedbank accumulation and fire season and intensity that promote germination and seedling establishment.
- Ensure fire response plan has been incorporated into the Blackwood District's Fire Control Working Plan, and update when necessary. Inform other fire fighting agencies of appropriate responses to fire threatening these sites.
- Any use of prescribed or experimental fires must be justified, in an adaptive management framework involving objectives of both learning and management. Prescribed fire operations should be integrated into an experimental design and a monitoring program late autumn, winter and spring ignitions should be avoided, as these may have a highly detrimental effect upon the long-term viability and sustainability of the species and are likely to have a deleterious impact on other native species that provide the natural community context for the species.
- 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

- Preserve germplasm to guard against extinction if the wild population is lost, and to propagate plants for translocations. Continue to collect seed and cuttings for translocations.
- Prepare and implement a translocation proposal.
- Continue propagating plants for translocation as necessary and undertake additional plantings in accordance with an approved Translocation Proposal.
- Carry out experimental soil disturbance at sites when mature plants senesce (age) to encourage recruitment. Soil disturbance has been shown to be effective in stimulating the germination of soil-stored seed. The outcomes of this management activity should be monitored within a replicated and controlled experimental design at an appropriate spatial scale.
- Contact the nursery industry regarding the possible propagation of the species as a nursery plant.

#### Impacts of domestic species

- If livestock grazing occurs in the area, ensure land owners/managers use an appropriate management regime and density that does not detrimentally affect this species to allow regeneration from seedlings and manage total grazing pressure at important sites through exclusion fencing or other barriers.
- Develop and implement a livestock management plan for McCutcheon's grevillea for road side verges and travelling stock routes. Distribute this information to drivers and

graziers in the area to increase co-operation and awareness of the species requirement.

### Stakeholder Engagement

- Continue to liaise with relevant land managers and land users to ensure that populations of McCutcheon's grevillea are not accidentally damaged or destroyed.
- Prepare a management strategy with input from local experts.
- Encourage formal links with local naturalist groups and interested individuals.
- Continue promoting the importance of biodiversity conservation and the need for the long-term protection of McCutcheon's grevillea in the wild to the general community through the local print, electronic media and poster displays.
- Produce and/or distribute an information sheet, which includes a description of the plant, its habitat type, threats, management actions and photos.

### Survey and Monitoring priorities

- Monitor the progress of recovery, including the effectiveness of management actions and the need to adapt them if necessary.
- Support and enhance existing programs for regular monitoring of wild and translocated populations.
- Implement an annual census to monitor seedling emergence, survival, reproduction and resprouting success.
- Surveys are best conducted when the species is in flower, however it can be identified without flowers (WA DEC 2007).

### Information and research priorities

- Investigate options for linking, enhancing or establishing additional populations.
- Research the species' response to fire using observational methods and laboratory experiments that have minimal impacts on the species population and its habitat.
- Assess the species' ecological requirements for recruitment.
- Continue to undertake seed germination and/or vegetative propagation trials to determine dormancy mechanisms, soil seed bank longevity and the requirements for successful establishment.
- Research the effects of public access where this is likely and the effects are unknown.

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