

THREATENED SPECIES SCIENTIFIC COMMITTEE

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

The Minister's delegate approved this Conservation Advice on 01/04/2016.

Conservation Advice

Eremophila denticulata subsp. *trisulcata*

cumquat eremophila

Conservation Status

Eremophila denticulata subsp. *trisulcata* (cumquat eremophila) is listed as Endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act). The subspecies 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).

As assessed by the Western Australian Government, the cumquat eremophila is eligible for listing in the Endangered category as it meets IUCN criterion B1ab(iv,v)+ 2ab(iv,v) (geographic distribution is precarious for its survival given its restricted distribution, it occurs at few locations and it has had a declining number of subpopulations and mature individuals) (DPAW, 2014).

Description

The cumquat eremophila is an erect shrub that grows to 1-2.5 m high. It has resinous, shiny branches and alternate, dark green, shiny leaves with entire or, very rarely, obscurely denticulate (teeth-like) margins. Buds are generally orange while mature flowers, which grow between 15-30 mm long, are carmine (a vivid red) in colour. The fruit is usually ovoid to subglobular in shape, with the apex depressed. The fruit also have three, deeply trisecting furrows and this is the source of its subspecific name (*trisulcata* is Latin for three-furrowed) (CALM, 2004). The cumquat eremophila occurs to the east of Esperance whereas *E. d.* subsp. *denticulata* occurs to the west of the town (Western Australian Herbarium, 2015).

Distribution

The cumquat eremophila is known from five subpopulations over a range of 46 km north and north-west of Mt Ragged in Western Australia. In 2004, only three subpopulations were extant, the largest of which had 250 plants, another had 42 plants, and the third had 15 plants (CALM, 2004). Two other subpopulations had been surveyed as having an estimated 1500 individuals (in 1990) and 40 individuals (in 1986), in a survey conducted in 2004 no individuals were recorded (CALM, 2004).

The cumquat eremophila grows on powdery grey loams over limestone in tall *Eucalyptus ovularis* (small fruited gum) and *E. fraseri* subsp. *fraseri* woodland with *Melaleuca quadrifaria* (limestone honey-myrtle) and *M. sheathiana* (boree) (CALM, 2004). It is only known from disturbed sites such as on road verges and firebreaks.

Relevant Biology/Ecology

Much remains unknown about the biology and ecology of the cumquat eremophila. Because the taxon has only been found at disturbed sites it is likely to be a disturbance opportunist. The complete disappearance of several reasonably undisturbed populations only a few years after their discovery suggests that plants may be short lived (CALM, 2004).

Threats

Individuals of the species are threatened by inappropriate disturbance regimes, vehicle traffic, grazing and trampling, and weed invasion. Inappropriate fire and disturbance regimes may be responsible for poor recruitment, which is evident at all subpopulations (CALM, 2004). The following table lists key threat factors with supporting evidence:

Table 1: Threats identified to the cumquat eremophila (CALM, 2004)

Threat factor	Threat type	Threat status	Evidence base
Inappropriate disturbance regimes (fire and soil disturbance)	known	potential	<p>Occasional disturbance is needed for stimulate natural germination in the species. Too frequent disturbance (i.e. prior to germinants maturing), however, could deplete the soil seed bank and cause local extinction. Possibly as a result of a lack of disturbance, several large subpopulations in the 1990s were either extinct in 2004 or were represented by very few extant plants. Similarly, germination has been observed at sites following disturbance events (road maintenance and firebreak chaining).</p> <p>Wildfire suppression and prescribed burning represent particular threats to several subpopulations. For instance, two large subpopulations lie astride a mine road and an adjoining scrub-rolled firebreak. In the event of a wildfire in the vicinity of the subpopulations, the likely response will be to burn the scrub-rolled vegetation and to back burn other vegetation, depending on the location of the wildfire. Both fire control strategies would have serious consequences for the subspecies.</p>
Vehicle traffic	suspected	potential	<p>Vehicle traffic at roadside sites is a minor threat, either through direct injury to plants on the road verge or by dust build up on plants downwind of the traffic. This may result in either the death of plants or a reduction in their health.</p>
Grazing and trampling from invasive and introduced species	known	future	<p>Grazing and trampling by rabbits (<i>Oryctolagus cuniculus</i>), camels (<i>Camelus dromedarius</i>), horses (<i>Equus caballus</i>) and cattle (<i>Bos taurus</i>) is a moderate threat to all subpopulations. Monitoring in 2004 indicated that introduced animals have not yet had a direct and significant impact on subpopulations but are impacting adjoining habitat.</p> <p>If grazing and trampling pressure were to increase it could: impact the establishment of seedlings (thus limiting the subspecies natural recruitment); and damage mature plants, reducing the reproductive potential of subpopulations and, consequently, the availability of seeds for recruitment. In addition, rabbit warren excavation and increased nutrient levels from droppings could degrade habitat quality.</p>
Weed invasion	suspected	future	<p>Weed invasion was identified as a minor threat to all subpopulations in 2004. The effect of weeds is uncertain but they are likely to compete for soil moisture and nutrients. Weeds may also increase the fire hazard due to the easy ignition of high fuel loads produced annually by many grass weed species.</p>
Insecure land tenure	potential	future	<p>Insecure tenure is a minor threat to all subpopulations. It could result in an adverse change in land management practices and may place subpopulations at risk from future inappropriate management practices.</p>

Conservation Actions

Conservation and Management priorities

Fire

- The cumquat eremophila is positively and negatively impacted by fire by being a post-fire germinator. Develop and implement an appropriate fire management regime that recommends fire frequency, intensity, season and control measures. The strategy should aim to protect habitat, limit negative impacts from bushfire hazard reduction activities and buffer subpopulations from negative impacts of wildfire or managed fire.

- The frequency of hazard reduction burns should be determined to minimise the potential of destroying soil stored seed and burning of juvenile plants before reaching maturity (CALM, 2004). It is recommended that, if required, prescribed burns do not occur during the flowering period October to March. Noting that late autumn, winter and spring ignitions will have a highly detrimental effect upon the long-term viability and sustainability of the cumquat eremophila and is likely to have a deleterious impact on other native species that co-exist with the subspecies.
- Critically, any use of prescribed fires must be very well justified, and is typically an action of last resort. It must have a carefully planned weed management strategy and demonstrated funding to ensure post-fire monitoring and control actions occur (e.g. weed control based on sound scientific evidence).
- Provide maps of known occurrences to local and state Rural Fire Services and seek inclusion of mitigation measures in bush fire risk management plans, risk register and operation maps.

Invasive species

- Control rabbits by referring to relevant policies for guidance (e.g. DEWHA 2008).

Impacts of domestic species

- Ensure graziers use an appropriate management regime that includes setting stocking rates at a level that does not detrimentally affect the cumquat eremophila's ability to regenerate from seed and manages total grazing pressure at important sites through exclusion fencing or other barriers.
- Develop and implement a stock management plan for the cumquat eremophila for road side verges. Distribute this information to drovers and graziers in the area to increase awareness of the subspecies requirements.

Ex situ conservation

- Preservation of genetic material is essential to guard against extinction if wild populations are lost. Seed and cutting material should be obtained with seed stored at CALM's Threatened Flora seed Centre (TFSC) and cutting material used to establish a living collection at the Botanic Gardens and Parks Authority (BGPA) (CALM 2004).

Stakeholder engagement

- Liaise with relevant land managers and landowners to ensure that subpopulations are not accidentally damaged or destroyed through fire break maintenance, track maintenance, grazing and weed invasion when conducting activities in close proximity to cumquat eremophila populations.
- Identify and seek input from any Indigenous groups that have an active interest in areas that are habitat for the cumquat eremophila.
- Promote awareness of the importance of biodiversity conservation and the need for the long-term protection of wild subpopulations of the cumquat eremophila through community engagement.
- Develop formal links with local naturalist groups and interested individuals to aid in monitoring of the cumquat eremophila.
- Develop information sheets that include a description of the plant, its habitat, threats conservation actions and photos to aid in awareness of the cumquat eremophila, especially as it know to occur on roadside verges.

Survey and Monitoring Priorities

- Undertake surveys of suitable habitat and potential habitat to locate any additional subpopulations of the cumquat eremophila and develop species distribution models for the subspecies' geographic distribution based on the environmental conditions of sites of known occurrences (Phillips et al., 2006).
- Survey known locations of the cumquat eremophila and more precisely assess the subspecies population size, ecological requirements and the relative impacts of threatening processes (CALM 2004).

- Monitor post-fire regeneration including, plant size and the timing and abundance of flowering and fruiting (CALM 2004).
- Monitor the progress of recovery, including the effectiveness of management actions and the need to adapt them if necessary.

Information and Research Priorities

- Assess the subspecies' ecological requirements relevant to the persistence of the subspecies including recruitment, generation length and fecundity to enable the improvement of conservation actions.
- Develop habitat suitability models to determine the ecological/environmental indices responsible for the subspecies distribution, and how it may change due to the impending threats such as grazing and inappropriate fire regimes and soil disturbance (Guisan & Zimmermann 2000).
- Undertake seed germination and/or vegetative propagation trials to determine the requirements for successful establishment.

References cited in the advice

CALM (Department of Conservation and Land Management) (2004). Cumquat *Eremophila* (*Eremophila denticulate* subsp. *trisulcata*) Interim Recovery Plan 2004-2009. Interim Recovery Plan No. 184, Department of Conservation and Land Management, Perth, Western Australia.

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Other sources cited in the advice

Western Australian Herbarium (2015). FloraBase—the Western Australian Flora. Department of Parks and Wildlife.

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Available on the Internet at: <https://florabase.dpaw.wa.gov.au/>