

# 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 13/07/2017.

## Conservation Advice

### *Jacksonia pungens*

pungent jacksonia

#### Conservation Status

*Jacksonia pungens* (pungent jacksonia) is listed as Endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act) effective from 16 July 2000. The species was eligible for listing under the EPBC Act as on 16 July 2000 it was listed as Endangered under Schedule 1 of the preceding Act, the *Endangered Species Protection Act 1992* (Cwlth).

The pungent jacksonia is listed as Critically Endangered in Western Australia under the *Wildlife Conservation Act 1950*.

The main factors that are the cause of the species being eligible for listing in the Endangered category are its limited distribution, observed population reduction, low number of mature individuals and a continuing decline.

#### Description

The pungent jacksonia has conspicuous orange pea flowers with red markings surrounded by large bracteoles (leaf-like structures that cup the underside of each flower). The bracteoles splay open during flowering and then close over the developing fruit, with the calyx (outer covering of the bud) characteristically erect after flowering. Growing 30 – 100 cm tall and 40 – 100 cm wide, this domed grey shrub is densely branched, with flowers scattered along pungent tipped branches. The pods are flat, covered in downy hairs and have woody valves that dehisce (split open) before dropping (Chappill 1998; DEC 2008).

#### Distribution

The pungent jacksonia is confined to Marchagee/Dalwallinu areas in Western Australia (DEC 2009). Between 1996 – 1998 it was known from three populations spread over seven sites, totalling 170 individuals (Evans & English 1999). Three of these sites had only a single individual with the bulk of the total population occurring at two sites with an estimated 80 and 85 individuals respectively (Evans & English 1999) All sites were in poor condition (DEC 2009).

In 2008 the distribution was revised to include 12 populations, four of which were considered healthy, and the total number of nature individuals was recalculated to be approximately 300 (DEC 2009). Of the 12 populations, nine occur on road and rail reserves, and three are located on private property (DEC 2009).

#### Relevant Biology/Ecology

The pungent jacksonia grows from a soil-stored seedbank on yellow to brown sand or gravelly lateritic soil with quartzite over chert. The associated vegetation is characterised by tall shrubland of *Allocasuarina campestris* (shrubby she-oak) and *Actinostrobus* sp. (cypress pines) (Chappill 1998).

The pungent jacksonia flowers briefly within a period of several weeks (DEC 2008; Evans & English 1999). Flowering may commence as early as October (Evans & English 1999; DEC 2008) and as late as January (DEC 2008). The species is a disturbance opportunist, growing in rip lines, graded firebreaks and the disturbed section of road and rail reserves (Evans

& English 1999), and germinating from soil-stored seed after fire or light grading (Brown et al., 1998). Fire is likely to be necessary for seed germination (Evans & English 1999).

The majority of species in the genus *Jacksonia* tolerate acidic to neutral soils, and light to moderate frosts. *Jacksonia* species are commonly propagated from seed and germinate readily after the seed coat has been removed to allow water absorption. The species has also been successfully propagated by hardwood cuttings (Elliot & Jones 1990).

*Rolandia maculata* (a pollen wasp), has been observed gathering pollen from *Jacksonia* species (Houston 1995) and is a potential pollinator of this species (Evans & English 1999).

## Threats

This species is threatened by a range of physical disturbance factors, mainly road and rail maintenance and destruction by vehicles, but also weed incursion, inappropriately frequent fire, farm maintenance, grazing and loss of flowers through picking (Evans & English 1999).

Table 1 – Threats impacting the pungent jacksonia in approximate order of severity of risk, based on available evidence:

Threat factor	Threat type and status	Evidence base
Physical disturbance (human activity)		
Road and rail maintenance	known past/ suspected current	Road, rail and firebreak maintenance activities, such as construction of drainage channels, mowing and grading of roadside vegetation, and sleeper replacement works along rail lines, have been known to cause damage to pungent jacksonia populations in road and rail reserves (Brown et al., 1998). In 2008, this was suspected to be an ongoing threat. (DEC 2008; Evans & English 1999).
Damage from vehicle use	known past/ suspected current	Damage by vehicle use was identified as a primary threat to this species by Evans & English (1999), who cited previous damage to individuals on the 'batter' (roadside slope) within local government managed road reserves.
Farming maintenance	known past/ suspected current	Farming activities of fence and firebreak maintenance may damage plants that are growing close to fence lines and on firebreaks. Some populations are close enough to crops to be affected by chemical drift from herbicide and fertiliser applications from adjacent farmland.
Invasive species		
Competition from invasive weeds	Known current	Weed invasion and competition was a known threat to all populations in 2008, and is likely to be ongoing (DEC 2008). The threat was especially severe for populations on rail and road reserves, but also to a lesser extent to populations occurring on private property. Weeds compete with adult plants for light, moisture and nutrients, and reduce the chance of regeneration from soil stored seed. Weeds also increase fuel loads and exacerbate the fire risk (Evans & English 1999).

Livestock browsing		
Browsing by sheep ( <i>Ovis aries</i> )	Potential current	In 1999, browsing was identified as a potential threat to one population as the surrounding livestock exclusion fence had fallen into disrepair (Evans & English 1999).
Disease		
<i>Phytophthora cinnamomi</i>	Suspected current	Pungent jacksonia may be susceptible to <i>Phytophthora cinnamomi</i> (dieback disease) (Patrick & Brown 2001).
Fire		
Too frequent burning	Suspected current	Although it has been suggested fire may be important in the ecology of this species (Evans & English 1999), fire events occurring too frequently (that is, before the seeds stimulated by the previous fire have had enough time to mature and replenish the soil seed bank) may be harmful for this species (Evans & English 1999).  Fire also facilitates weed incursion (Evans & English 1999).

## Conservation Actions

### Conservation and Management priorities

#### Physical disturbance (human activity)

- Prevent habitat disturbance through the installation of fencing and/or signage/DRF markers<sup>1</sup> as appropriate. Only fence areas where there is evidence of disturbance by human activity or excessive grazing by livestock (see stakeholder engagement section below for further actions relating to mitigating the effects of human activity).

#### Invasive species

- Continue to select herbicides appropriate for the control of specific weed species present at sites where pungent jacksonia occurs.
- Control invasive weeds by hand removal or spot spraying when weeds first emerge. Consider the possible disturbance/overspray threats associated with the control method.

#### Livestock browsing

- Maintain fencing to exclude sheep from populations threatened by grazing pressure.

#### Disease

- Implement a *P. cinnamomi* management plan to ensure that the fungus is not introduced into locations of the threatened species and that the spread in areas outside of, but adjacent to population is mitigated (DoE 2014).
- Ensure that appropriate hygiene protocols are adhered to when entering or exiting the known location of the threatened species, such as those outlined in Podger et al. (2001).

<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 a hygiene management plan and risk assessment to protect known populations from further outbreaks of *P. cinnamomi*. This may include but is not limited to:
  - Contaminated water is not used for firefighting purposes,
  - Contaminated soil is not introduced into the area as part of restoration, translocation, infrastructure development or revegetation activities,
  - Ensure that areas where the threatened species is known to occur that are *P. cinnamomi* free are sign posted and hygiene stations are implemented and maintained.
- Implement mitigation measures in areas that are known to be infected by *P. cinnamomi*, this may include but is not limited to;
  - Application of phosphite ( $H_3PO_3$ ), noting the potential deleterious effects as a fertiliser with prolonged usage.

#### Fire

- Fires must be managed to ensure that prevailing fire regimes do not disrupt the life cycle of the threatened species, that they support rather than degrade the habitat necessary to the pungent jacksonia, that they do not promote invasion of exotic species (especially weeds), and that they do not increase impacts of grazing.
- Avoid use of managed fire research and other activities that impact upon the persistence of the population unless there is evidence to show the impact would be a positive and enduring effect on the pungent jacksonia persistence.
- Avoid the use of fire retardants, fire-fighting foams during fire operations.
- Physical damage to the habitat and individuals of the pungent jacksonia must be avoided during and after fire operations.
- Fire management authorities and land management agencies should use suitable maps and install field markers to avoid damage to the pungent jacksonia.
- Minimise use of prescribed fire and follow up with appropriate weed control.
- Ensure that fires do not occur within populations before an accumulation of a seedbank large enough to replace the number of fire-killed standing plants (noting the assumed “replacement” ratio should incorporate expected post-fire rates of seedling survival).
- Avoid uses of prescribed fire between mid-autumn and late spring.

#### Ex situ Strategies

- Continue seed storage at Department of Parks and Wildlife’s Threatened Flora Seed Centre and ex situ propagation via the Botanic Gardens and Parks Authority nursery at Kings Park in Perth.

#### Translocation

- Using habitat suitability modelling as guidance, identify suitable sites for the establishment of additional populations in the wild and for linking existing populations. Relevant policies should be referred to for guidance for undertaking translocations (e.g. Vallee et al. 2004).

#### Stakeholder Engagement

- Stakeholders for this species include local councils (Moora District, Coorow Shire), road and rail organisations (Main Roads Western Australia and Westrail), residents whose property contains or is adjacent to populations of the species, conservation groups and road users.
- Public engagement should have the objectives of raising awareness of the fragility of the populations, deterring physical damage (picking, vehicle damage, grazing etc), avoiding damage from proximate herbicide and fertiliser applications, and the inadvertent spread of disease.

### **Survey and Monitoring priorities**

- Undertake surveys in suitable habitat to locate additional populations of the pungent jacksonia.
- Monitor the progress of recovery of the species, including the effectiveness of management actions and the need to adapt them if necessary.
- As part of the monitoring program, more precisely assess ecological requirements and the relative impacts of threatening processes, especially physical disturbance.
- Monitor the response of populations to disturbance events including fires (where they occur), noting the season and maturity of the population. Use an appropriate measure (e.g. species composition, populations of key species) based on knowledge of the ecology of the ecological communities in which the species occurs, and with a monitoring design that aims to improve understanding of the species' response to disturbance.
- Maintain precise fire history records for the habitat in which known populations of the species occur.
- Implement an annual census to monitor seedling emergence and resprouting success.

### **Information and research priorities**

- Continue to obtain biological and ecological information about the pungent jacksonia, especially: seed germination requirements and the role of disturbance (including fire) in regeneration; longevity of the species; and time taken to reach maturity. Apply the information gathered to determine optimal fire regimes (frequency and intensity parameters) for the species, with a view to determining the optimal regime to promote regeneration.
- Investigate options for linking, enhancing or establishing additional populations in suitable habitats less prone to threats.
- Where appropriate, use information available on the fire ecology of related (e.g. congeneric) or functionally similar species and ecological communities to develop fire management strategies for conservation.
- Undertake seed germination and/or vegetative propagation trials to determine the requirements for successful establishment.

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