

# 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 01/10/2015

## Conservation Advice

### *Patersonia spirifolia*

spiral-leaved patersonia

#### Conservation Status

*Patersonia spirifolia* (spiral-leaved patersonia) is listed as Endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act). The species is eligible for listing as Endangered 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 spiral-leaved patersonia being eligible for listing in the Endangered category are its restricted extent of occurrence, highly fragmented distribution, low population size and continued declines in the number of mature individuals and the quality of habitat.

#### Description

The spiral-leaved patersonia is a perennial herb growing to 50 cm tall with a spreading woody rootstock producing a tussock up to 40 cm wide. The leaves are linear, spirally twisted, up to 20 cm long and 5 mm wide. The brown leaf margins have fringes of soft hairs that point towards the centre of the leaf. The scape (leafless flowering stem) is up to 25 cm long, 1-2 mm wide and reddish-green. The spathe (a leaf-like structure enveloping the flower cluster) is brown in colour, lance-shaped and up to 26 mm long with thin, almost transparent margins. The flowers have three broad, mauve to blue-violet coloured sepals (petal-like structures) up to 19 mm long and 14 mm wide, and three very small, upright, blue-violet coloured petals about 1 mm long. The seed capsule is roughly egg-shaped and up to 3 cm long (Keighery, 1990, and Patrick and Brown, 2001, cited in WA CALM, 2004).

The species is grouped with other Western Australian species of *Patersonia* which form tussocks, namely *Patersonia inaequalis* and *P. drummondii*. It differs from *P. inaequalis* in having purple flowers and brown spathes, and from *P. drummondii* in the short, closely pressed hairs on the leaf margins and in the shorter spathes (Keighery cited in WA CALM, 2004).

#### Distribution

Six populations of the spiral-leaved patersonia have been recorded in the region up to 10 km south-west of Badgingarra, Western Australia, since the species was identified in 1988 (Sheehy pers. comm., 2011; Todd pers. comm., 2011; WA CALM, 2004). One population, referred to as Population 1 in the *Spiral Flag (Patersonia spirifolia [sic]) Interim Recovery Plan 2004-2009* (WA CALM, 2004), is located in Badgingarra National Park and the remainder (Populations 2–6) occur in road reserves outside the national park.

#### Populations

A large majority of the total population of the spiral-leaved patersonia has been recorded in Populations 1 and 5. More than 200 plants were recorded in Population 1 in 1996 and 437 plants were recorded in Population 5 in 2004 (WA CALM, 2004). Surveys conducted since 2003 have shown that the remaining populations are relatively small: 17 plants were counted in Population 4 in 2003 and no more than six plants have ever been recorded in Populations 2, 3 and 6 (Sheehy pers. comm., 2011; Todd pers. comm., 2011). Large fluctuations in the apparent sizes of Populations 1 and 5 since 2003 may not reflect the long-term trajectories of these

populations. The species can be difficult to locate in its habitat and the large fluctuations recorded may reflect differences in survey accuracy and effort (Todd pers. comm., 2011).

Given that the spiral-leaved patersonia is listed as endangered, it is considered that all wild and translocated populations are important populations that are necessary for the species' long-term survival (WA CALM, 2004).

### **Habitat**

The spiral-leaved patersonia is found on lateritic ridges and slopes, or sand over laterite in low species-rich heath. Associated species include *Allocasuarina humilis*, *Daviesia chapmanii*, *D. epiphyllum*, *Gastrolobium spinosum*, *Mesomelaena stygia*, *M. tetragona*, *Patersonia occidentalis* and *Xanthorrhoea preissii* (WA CALM, 2004).

Given that the spiral-leaved patersonia is listed as Endangered, it is considered that any habitat where populations are known to occur is habitat critical to the survival of the species (WA CALM, 2004).

### **Threats**

The main threats to the spiral-leaved patersonia are (WA CALM, 2004):

- the complete destruction or removal of individual plants in road reserves resulting from road, powerline or firebreak maintenance activities, including:
  - road grading
  - construction of drainage channels
  - chemical spraying, and
  - destruction of plants due to mowing of roadside vegetation
- the loss, fragmentation or degradation of habitat resulting from the abovementioned activities
- the invasion or increased growth of weeds resulting from the dispersal of weed propagules along road corridors and promoted by habitat clearing or disturbance, and
- poor recruitment. No juvenile plants have been observed in any of the known populations. This may have been due to low levels of viable seed production or may have been related to an absence of germination triggers.

Potential threats to the spiral-leaved patersonia are the degradation and loss of populations due to dieback disease and fire, as discussed below.

#### Dieback disease

The fungal pathogen, *Phytophthora cinnamomi*, affects a variety of Australian native plants by causing root-rot and death, particularly when infected plants are subjected to stressful environmental conditions such as drought. While the susceptibility of the spiral-leaved patersonia to this pathogen is unknown, *P. cinnamomi* has been confirmed in the area within which Population 5 is located. The spiral-leaved patersonia may not be susceptible to this disease as it is thought to have the ability to grow new roots annually, which could replace those potentially affected by the disease. However, many of the plant species in the heath in which Population 5 occurs are characteristically susceptible to the disease and changes in the structural and floristic composition of the habitat (supporting vegetation community) caused by dieback may have an adverse impact on this population. This may include impacts such as opening up the canopy, and altering levels of shade and humidity (WA CALM, 2004).

#### Fire

Inappropriate fire regimes may affect the viability of a population of the spiral-leaved patersonia. While the species is known to resprout from its underground rhizome following a low-intensity fire or the physical removal of the aboveground parts of the plant, high-intensity fires are likely to destroy the rhizome. Although germination was not observed following an intense wildfire which burned through Population 1 in 2002, the effect of fire on germination is unknown. While low-intensity fires are unlikely to destroy the rhizome, frequent low-intensity burning is likely to alter the structural and floristic composition of the habitat and foster weed invasion and erosion.

## Conservation and Management Actions

### Prevent removal or damage of plants or habitat

- Continue to raise awareness of landholders and property managers about the spiral-leaved patersonia, its potential distribution, the locations of known populations and threats to its long-term survival, so that threatening actions may be prevented or their impacts mitigated.
- Continue to install and maintain Declared Rare Flora (DRF) markers at all known wild and translocated populations to alert maintenance workers and help to reduce potential damage or removal of vegetation in those areas.
- Continue to advise proponents of infrastructure construction and maintenance (e.g. roads and electricity transmission lines) at managerial and operational levels, including consultants and contractors, of the location and purpose of DRF markers.

### Restore populations and habitats

- Restore degraded habitat in which populations of the spiral-leaved patersonia are known to occur using best-practice bush regeneration techniques, including the use of appropriate weed management techniques determined through scientific trials.
- Collect seed from known populations of the species and store for the potential future restoration of populations and translocations.
- As the species only occurs on highly vulnerable roadsides, translocation to new, safe-sites within a substantial reserve system is a priority. Habitat matching (edaphic, vegetation, topography) should be undertaken in planning a translocation. Relevant policies should be referred to for guidance for undertaking translocations (e.g. CALM 1995; Vallee et al., 2004).
- Restore and maintain translocation habitats, connective corridors of remnant vegetation between known populations or assist the movement of pollinators between populations.
- Raise awareness of property managers and landholders of the species and its threats and encourage restoration of habitats and habitat connectivity.

### Fire hazard reduction

- Develop and implement a fire management strategy for the spiral-leaved patersonia based on research of the species' fire ecology and in consultation with the WA Department of Fire and Emergency Services, Bush Fire Brigades and all other stakeholders. Prescribed burning should not be undertaken until the species' fire ecology and all weed management impacts are fully understood.
- Continue to conduct fuel-reduction burns in accordance with the abovementioned fire management strategy to protect populations and their habitats.

### Disease prevention

- Maintain best-practice hygiene to protect known populations of the spiral-leaved patersonia and prevent the spread of *P. cinnamomi*.
- Continue to raise public and landholder awareness of *P. cinnamomi* dieback and the importance of maintaining best-practice hygiene.

## Stakeholder Management

- Continue to coordinate recovery actions for the spiral-leaved patersonia and liaise and cooperate with all stakeholders.
- Continue to identify and seek the involvement of stakeholder groups who have an active interest in the species' distribution.
- Continue to promote and maintain the awareness of landholders and managers, including private property owners who live adjacent to road reserve populations, and the community of the location and threatened status (Commonwealth and Western Australian) of the spiral-leaved patersonia and the associated legal obligations to avoid impacts on it.
- Continue to update information materials about the species.
- Continue to train interested stakeholders in survey techniques and identification of the species.

## Survey and Monitoring priorities

- Continue to regularly monitor populations of the spiral-leaved patersonia to assess:
  - any change in population sizes
  - the health of populations including recruitment and longevity of plants, seed production and abortion, degradation of plants due to herbivory, and the presence of disease, particularly dieback due to *P. cinnamomi* infection
  - pollination activity
  - habitat degradation, including weed invasion
  - regeneration in previously degraded populations, and
  - the visibility of DRF markers to ensure they remain effective (i.e. markers have not faded or been covered by vegetation).
- Conduct surveys in suitable habitat in Badgingarra National Park, in road reserves and on private property to locate undiscovered populations and more precisely assess population size and distribution.

## Information and research priorities

- Map suitable habitats to assist the detection of undiscovered populations of the spiral-leaved patersonia and the prioritisation of conservation actions.
- Investigate options for linking, enhancing or establishing additional populations.
- Research the biology/ecology of the species, including pollination, factors affecting the production of viable seed and germination.
- Continue research on seed germination and failure, and conduct vegetative propagation trials to determine the requirements for successful establishment.
- Research the fire ecology of the species: determine the effect of fire regimes (frequency and intensity of fire) on the survival and regeneration of the species, including seed germination and vegetative regrowth.
- Determine the susceptibility of the species/populations to dieback through *P. cinnamomi*.
- Determine the susceptibility of the species/populations to the range of weed management techniques.

## References cited in the advice

CALM (Department of Conservation and Land Management) (1995). Translocation of Threatened Flora and Fauna. Policy Statement No. 29. Government of Western Australia.

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WA CALM (Department of Conservation and Land Management) (2004). Spiral Flag (*Patersonia spirifolia* [sic]) Interim Recovery Plan 2004-2009. Available on the Department of Parks and Wildlife website at: <http://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities/198-approved-interim-recovery-plans>.