

# 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 15/07/2016.

## Conservation Advice

### *Asplenium listeri*

Christmas Island spleenwort

#### Conservation Status

*Asplenium listeri* (Christmas Island spleenwort) is listed as Critically Endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act) effective from the 23 July 2002.

The species was eligible for listing under the EPBC Act at that time it was assessed as having a very restricted area of occupancy and small population and was found eligible for listing under Criteria 2, 3 and 4.

#### Description

The Christmas Island spleenwort is a small, rock dwelling fern. Rhizomes are short, creeping, stout and scaly. Scales are narrowly ovate (3-6 mm long), latticed, dark brown, and glossy. Fronds are found in a crown, pinnate, erect and short (3.5-9 cm long). There are 8 to 18 ovate pinnae (8-18 mm long) with several lobes divided to near mid-vein, unequalled-sided, incised and toothed. Pinnae gradually reduce towards the apex. The cuneate at the base is more or less glabrous and coriaceous with a stalk 0.3 mm long. Lateral veins are forked and free. Sori are linear along lateral veins and the indusium is linear (DuPuy 1993).

#### Distribution

The Christmas Island spleenwort is endemic to Christmas Island. It occurs at the following six locations on the Island (D. Maple pers. comm. 2016; DuPuy 1993; Holmes & Holmes 2002):

- Gannet Hill, above the limestone terraces on the eastern side of the island within the Christmas Island National Park.
- Greta Beach Road on the eastern side of the island.
- Aldrich Hill on the southern side of the island within the Christmas Island National Park.
- Sydney's Dale (Dale No. 6) on the western side of the island within the Christmas Island National Park.
- North of the Christmas Island Resort on the eastern side of the island.
- Toms Ridge on the north-western peninsular of the island.

#### Relevant Biology/Ecology

The Christmas Island spleenwort occurs in limestone rock crevices at the uppermost part of dry and exposed inland cliffs that rise above marginal rainforest on terraces (DuPuy 1993). These areas tend to have rocky and narrow cliff-top strips up to 1.5 m wide and an open aspect on the seaward side (Butz 2004). The preferred habitat of the species is at an elevation of 110-255 m above sea level (Butz 2004). Some Christmas Island spleenwort subpopulations occur at sites that may be partly shaded and in association with curtain fig (*Ficus microcarpa*) (Holmes & Holmes 2002).

The Christmas Island spleenwort receives water from precipitation and moist flow from the south easterly trade winds which is captured by rock crevices (J. Tranter pers. comm. cited in Butz 2004). Rock crevices accumulate organic debris and are likely to protect the rhizomes from drying out during the dry season (R. Hart pers. comm. cited in Butz 2004). The vegetative parts of Christmas Island spleenworts die off when deprived of water during the dry season and resprout during the wet season (S. Sewell pers. comm. cited in Butz 2004).

The Christmas Island spleenwort is slow growing and a poor coloniser. Distribution and propagation of this species is likely to be related to moisture retention (Butz 2004; P. Reddel pers. comm. cited in Butz 2004).

## Threats

Table 1 – Threats impacting the Christmas Island spleenwort in order of severity of risk, based on available evidence.

Threat factor	Threat type and status	Evidence base
Climate change		
Altered seasonality & severe stochastic events.	potential	Altered seasonality (e.g. extended dry season) and severe stochastic events (e.g. cyclones and wildfire) associated with climate change threaten the continued survival of the Christmas Island spleenwort due to its small population, restricted distribution and exposed habitat. The species is at risk of mortality through desiccation during severe dry seasons, and severe rainfall is likely to scour organic debris from rock crevices exposing rhizomes (Butz 2004).
Invasive species		
Habitat modification from yellow crazy ant ( <i>Anoplolepis gracilipes</i> )	potential	Yellow crazy ants are known to cause defoliation and excess production of honeydew in large forest trees, including curtain figs, which in turn promotes growth of sooty mould on lower vegetation. Sooty mould may impact Christmas Island spleenwort through suppressed photosynthesis (Parks Australia).
Black rat ( <i>Rattus rattus</i> )	potential	Black rats may pose a threat to the Christmas Island spleenwort through foraging. Campbell et al. (1984) found that Polynesian rats ( <i>Rattus exulans</i> ) foraged on the petioles of shining spleenwort ( <i>Asplenium oblongifolium</i> ) in the northern offshore islands of New Zealand. However, the threat of foraging by black rats on the Christmas Island spleenwort has not been demonstrated.
Habitat loss, disturbance and modifications		
Mining and construction activities	potential	If undertaken in the vicinity of a known subpopulation, mining and construction activities may pose a threat to the Christmas Island spleenwort through habitat disturbance and dust deposition (Butz 2004). Mining or construction activities do not currently threaten the species.

## **Conservation Actions**

### **Conservation and Management priorities**

Breeding, propagation and other *ex situ* conservation action

- Establish cultivated plants *ex situ* for inclusion in living collections, to safeguard against any unforeseen destruction of wild subpopulations.

### **Stakeholder Engagement**

- Liaise with organisations which have undertaken, or are currently undertaking, research for the Christmas Island spleenwort, including The University of Melbourne (School of Botany).
- Engage with construction, mining and tourism companies, including Christmas Island Phosphates and Christmas Island Tourism Association, to provide information about the Christmas Island spleenwort and importance of conserving sites where the species is known to occur.
- Engage with the local community to promote conservation of the Christmas Island spleenwort.

### **Survey and Monitoring priorities**

- Design and implement a monitoring program to more precisely assess population size, population structure, distribution, recruitment and the relative impacts of climate change and invasive species.
- Undertake surveys in suitable habitat to locate any additional occurrences.
- Undertake surveys on known subpopulations following extended dry seasons or severe weather events (such as cyclones) to determine the impact of stochastic climatic conditions on the species.

### **Information and research priorities**

- Undertake trials to develop effective propagation and cultivation techniques for an *ex situ* cultivation program.
- Investigate options for enhancing known subpopulations or establishing additional subpopulations on Christmas Island.
- Research the impact of black rats and giant African land snails (*Achatina spp.*) on Christmas Island spleenwort to determine if these species pose a measurable threat to the Christmas Island spleenwort.
- Research the secondary effects of phosphate mining (e.g. dust deposition) on the species to determine whether proximity to mining operations is a threat to the species.
- Investigate the threat of weed species on the Christmas Island spleenwort to determine if targeted weed management actions are required to conserve the species.

## **References cited in the advice**

- Butz, M. (2004). National Recovery Plan for the Christmas Island Spleenwort *Asplenium listeri*. Commonwealth of Australia, Canberra.
- Campbell, D. J., Moller, H., Ramsay, G. W. & Wait, J. C. (1984). Observations on foods of Kiore (*Rattus exulans*) found in husking stations on northern offshore islands of New Zealand. *New Zealand Journal of Ecology* 7: 131-138.

DuPuy, D. J. (1993). Aspleniaceae. In: Flora of Australia. *Oceanic islands* 50, 554-558. Australian Government Publishing Service, Canberra

Holmes, J. & Holmes, G. (2002). Conservation status of the flora of Christmas Island, Indian Ocean: report to Environment Australia/Parks Australia North, Glenn Holmes and Associates.

Parks Australia (no date). Christmas Island Yellow Crazy Ant Control Program. Australian Government. Viewed 24 March 2016. Available on the internet at:  
<http://www.environment.gov.au/system/files/resources/898583db-b929-491a-8448-73fb652bca66/files/brochure-detail-crazy-ant-control-options.pdf>

### **Other sources cited in the advice**

Maple, D. (2016). Personal communication by email. 18 May 2016. Natural Resource Manager for Christmas Island National Park. Parks Australia.