

THREATENED SPECIES SCIENTIFIC COMMITTEE

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

The Minister's delegate approved this Conservation Advice on 13/07/2017.

Conservation Advice

Isopogon uncinatus

Albany cone bush

Conservation Status

Isopogon uncinatus (Albany cone bush) is listed as Endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act) effective from 16 July 2000. The species is eligible for listing under the EPBC Act as on 16 July 2000 it was listed as Endangered under Schedule 1 of the *Endangered Species Protection Act 1992* (Cwlth).

The Albany cone bush 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 the severe fragmentation of populations and continuing decline in the extent of occurrence due to declining quality of habitat, and low number of locations and individuals.

Description

Albany cone bush is a small shrub 15 to 30 cm high and a similar width across, with very short stems. It has entire, sword-like leaves with a curved apex. Young leaves are hooked (uncinate) and topped with small points, while mature leaves are petiolate and up to 30 cm long. Flower heads are aggregated. Cone scales are lanceolate and villous, the outer scales broad and inner ones narrow. Small yellow flowers are produced in early November (Brown, 1830; Sainsbury, 1987 cited in Phillimore & Brown 2001). The Albany cone bush is difficult to identify without close examination. In particular, its leaves are very similar in shape to *Conospermum capitatum* (Phillimore & Brown 2001).

Distribution

The Albany cone bush is endemic to Western Australia where it is confined to the Albany area. In 2001, it was known from nine populations and an estimated 100 adult plants (Phillimore & Brown 2001). Almost all populations occur within a Torndirrup National park, with the exception of a populations on a non-vested defence reserve, a shire reserve and a private property (Phillimore & Brown 2001). The Albany cone bush occurs in soil that is seasonally damp, shallow sandy-clay over granite, or gravelly soil from decomposed laterite over granite, in saddles between summit rocks.

Relevant Biology/Ecology

Little is known about the biology and ecology of the Albany cone bush (Phillimore & Brown 2001). The majority of information provided in the 2001 interim recovery plan (Phillimore & Brown 2001) is based on field observations. Response to fire is not understood, however Phillimore and Brown (2001) note that the species has a soil seedbank. New growth has been observed from new cones which are fruiting bodies, at the base and this growth is pink or red

(Phillimore & Brown 2001). The Albany cone bush also forms matt-like clumps from old cones that are scattered along stems at ground level (Phillimore & Brown 2001).

Associated vegetation is heath(Phillimore & Brown 2001).

Threats

The Albany cone bush is threatened by disease, habitat loss and modification and too frequent fire. The threats and their effects on the Albany cone bush are described in the table below. The threats outlined below have corresponding conservation management priorities.

Table 1 – Threats impacting the Albany cone bush in approximate order of severity of risk, based on available evidence.

Threat factor	Threat type and status	Evidence base
Disease		
<i>Phytophthora cinnamomi</i>	known current past	<i>Phytophthora cinnamomi</i> effects physiological and biochemical pathways in infected plants (DOE 2014). Uptake of water is often the first pathway to be effected and in susceptible species healthy plants can suddenly die (DOE 2014). DPAW staff in the late 1990s conducted aerial spraying of phosphite to areas and monitored the effects of phosphite application. In 2001 plants form one population were observed to have Aerial canker and plants in that population were dying (Phillimore & Brown 2001).
Fire		
To frequent burning	suspected current	High frequency fires during key points in the life cycle may kill the Albany cone bush. Frequent fire may diminish the soil seedbank, stop juveniles from developing and prevent seed set by mature individuals (Phillimore & Brown 2001).
Grazing		
Grazing		Phillimore and Brown (2001) state that the effect of grazing were unclear however, noted that grazing may compound the effects of disease and habitat loss, disturbance and modifications. Damage caused by stock trampling and browsing on individuals that are infected by <i>Phytophthora cinnamomi</i> and Aerial canker may contribute to mortality (Phillimore & Brown 2001). Browsing by native herbivores may introduce <i>P.cinnamomi</i> (Phillimore & Brown 2001).
Habitat loss disturbance and modifications		
Recreational activities		In 2001 plants in a population located in a shire reserve were damaged by recreational activities including being driven over by vehicles (Phillimore & Brown 2001).

Conservation Actions

Conservation and Management priorities

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).
- 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 Albany cone bush, that they support rather than degrade the habitat, that they do not promote invasion of exotic species, and that they do not increase impacts of grazing/predation.
- 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. Replacement should incorporate expected post-fire rates of seedling survival.
- Ensure that fires do not occur in winter or spring, avoiding the exposure of sub-mature seedling recruits to desiccating conditions over summer.
- Ensure that intervals between successive fires take into account the longevity of the standing plant population.
- Physical damage to the habitat and individuals of the Albany cone bush 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 Albany cone bush.

Grazing

- If livestock grazing occurs in the area, ensure land owners and managers use an appropriate management regime and density that does not detrimentally affect this species and manage total grazing pressure at important sites through exclusion fencing

or other barriers not only to prevent trampling and grazing but also the spread and introduction of *P. cinnamomi*.

- Consider exclusion fencing for populations in Torndirrup National Park that are subject to grazing by native herbivores to prevent damage to individuals and the introduction of *P. cinnamomi*.

Habitat loss disturbance and modifications

- Ensure land managers and ranger in the Torndirrup National Park are aware of the species' occurrence and provide protection measures against key and potential threats relating to recreational activities.
- Maintain Declared Rare Flora (DRF) markers¹. 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.

Ex situ Strategies

- Ex situ seed banks provide an important capacity for medium to long-term storage of diaspores of threatened plant species. Where storable diaspores (seeds, spores, dispersal units) are available seed banking should be undertaken in consultation with relevant seed storage professional advice as to appropriate conditions (collection and post-harvest treatment; pre-storage drying; storage temperature; curation and auditing) to ensure diaspore viability is retained.
- Seed should be appropriately sourced and stored in a seed bank facility using best practice seed storage guidelines and procedures to maximise seed viability and germinability.

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

- Determine objectives to improve management on private land to ensure recent scientific knowledge is incorporated into public land management and management in Torndirrup National Park. Separate engagement processes will likely be required where there are different objectives.
- Prepare a management strategy with the input and from local experts.
- Actions should be stated for each engagement process identified e.g. Indigenous consultation, a specific community consultation, or land manager consultation.

Survey and Monitoring priorities

- More precisely assess population size, distribution, ecological requirements to better understand the Albany cone bush.

¹ 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).

- Monitor the progress of recovery, including the effectiveness of management actions and the need to adapt them if necessary
- Design and implement a monitoring program at site that in areas of known *Phytophthora cinnamomi* infection.
- Monitor the size and structure and reproductive status of populations at different stages in the fire cycle, taking opportunities to monitor after planned and unplanned fires (where they occur) and improve understanding of the fire response of the Albany cone bush.
- Precise fire history records must be kept for the habitat and extant populations (confirmed and suspected) of the Albany cone bush.
- If the application of phosphite (H₃PO₃) is used to mitigate *P.cinnamomi* monitor the impact of the application.

Information and research priorities

- Assess the Albany cone bushes' ecological requirements relevant to the persistence of the species including recruitment.
- Undertake surveys in areas of suitable and potential habitat to locate any additional occurrences to more precisely assess population size and distribution.
- Improve understanding of the mechanisms of response to different fire regimes and identify appropriate fire regimes for conservation of the Albany cone bush by undertaking appropriately designed experiments in the field and/or laboratory.
- Where appropriate, use understanding and research on fire responses among related (e.g. congeneric) or functionally similar species to develop fire management strategies for conservation.
- Identify optimal fire regimes for regeneration (vegetative regrowth and/or seed germination), and response to other prevailing fire regimes.
- Undertake seed germination and/or vegetative propagation trials to determine the requirements for successful establishment.
- Research the effects of public access where this is likely and the effects are unknown.
- Implement an annual census to monitor emergence and resprouting success.

References cited in the advice

Department of the Environment (2014). Threat abatement plan for disease in natural ecosystems caused by *Phytophthora cinnamomi*. Department of the Environment, Canberra ACT. Available from: <http://www.environment.gov.au/resource/threat-abatement-plan-disease-natural-ecosystems-caused-phytophthora-cinnamomi>

Phillimore R, & Brown, A. (2001). Interim Recovery Plan No. 82, Albany Cone Bush (*Isopogon uncinatus*) Interim Recovery Plan 2001-2003.

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