

THREATENED SPECIES SCIENTIFIC COMMITTEE

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

The Minister's delegate approved this Conservation Advice on 15/07/2016. Following an orthographic correction, the name in the EPBC Act list of threatened species was updated to *Chamelaucium* sp. Gingin (N.G.Marchant 6) on 07/12/2016.

Conservation Advice

Chamelaucium sp. Gingin (N.G.Marchant s.n., 4/11/1988)

Gingin wax

Conservation Status

Chamelaucium sp. Gingin (N.G.Marchant s.n., 4/11/1988) (Gingin wax) is listed as Endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act) effective from the 16 July 2000.

The species was eligible for listing under the EPBC Act at that time as, immediately 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 species is listed as Critically Endangered in Western Australia under the *Wildlife Conservation Act 1950* and was declared as Rare Flora in November 1998.

The main factors that are the cause of the species being eligible for listing in the Endangered category are a very restricted area of occupancy (less than 500 km²), the known populations are confined to a very limited geographical range and are highly fragmented.

Description

Gingin wax is an open straggly shrub 1 - 2 m tall with many slender, stiff branches that bear numerous 5 - 20 mm long axillary shoots. The erect bright green leaves are glandular and scattered along the main branches, but are mostly crowded on numerous short axillary shoots. The 6.6 – 9.2 mm flowers occur in groups of two to nine in small heads on axillary shoots. Up to 20 flowers are held in clusters at the end of main branches. The flowers are pale pinkish-white, the buds are tinged a deeper pink (Evans & English 1999; Stack & English 2003) and Flowering occurs September to December (Brown et al., 1998).

Distribution and habitat

Gingin wax is endemic to Western Australia and is confined to the Gingin/Chittering area. In 2003 there were six known populations comprising an estimated 4700 adult plants and 1800 juveniles (Stack & English 2003). An additional population, comprising one plant was recorded in 2007 (Atkins pers. comm., 2016). From surveys conducted between October 2009 to March 2010 at four of the seven known populations, the estimated number of plants was 7800 (Atkins pers. comm., 2016). The tenure status of the land on which the populations occur includes: private property, road reserve (Local Government Area), Breera Nature Reserve (Conservation Commission) and proposed nature reserve (Conservation Commission and State of Western Australia) (Atkins pers. comm., 2016).

The species occurs on white/yellow sand supporting open low woodland with *Eucalyptus todtiana* (pricklybark), *Banksia attenuata* (candle banksia), and *Hibbertia* sp. (Evans & English 1999).

Relevant Biology/Ecology

Plants take five years to reach maturity and produce seed, and possibly longer to build a sufficient soil seed bank, a fire frequency of five years or less would severely threaten the long-term viability of the species (Evans & English 1999). Seed set was found to be low, with many seeds aborting or not being pollinated (Evans & English 1999). European bees (*Apis mellifera*), native bees (*Hymenoptera*), native wasps (*Hymenoptera*), flies (*Diptera*), and beetles

(*Coleoptera*) have, however, all been observed feeding on the nectar of Gingin wax flowers and could be possible pollinators. In 2003, there had been no field observations of the natural seed dispersal mechanism.

In 2003, the species occurred on disturbed road reserves, firebreaks, powerline maintenance tracks, and in burnt bushland. Following a fire on a private property in January 1995 that killed most of the plants (30 plants remained after the fire), the landholder noted enhanced seedling germination as well as plants regenerating from root stock (the production of suckers) (Evans & English 1999). The landholder also noted that Gingin wax plants thrived after surrounding plants with a dense habit, such as *Adenanthos cygnorum* (common woollybush) and *Kunzea pubescens* (spearwood) were cleared away (Evans & English 1999).

Threats

Table 1 – Threats impacting Gingin wax in approximate order of severity of risk, based on available evidence.

Threat factor	Threat type and status	Evidence base
Fire		
Too frequent	known	It is known that seed of Gingin wax germinates following fire. The soil seed bank would rapidly be depleted if fires recur before juvenile plants reach maturity and replenish the soil seed bank. Field evidence suggests that it takes five years for plants to reach maturity and to flower and produce seed though longer time frames may be needed to ensure the soil seed bank is reconstituted.
No high intensity fires	known current	A lack of fire could cause low natural recruitment. It is likely that occasional fires are needed for reproduction of this species and that regeneration occurs from root stock after fire (opportunistic observation noted in Evans & English (1999)).
Invasive species		
Grazing	known current	Grazing by rabbits (<i>Oryctolagus cuniculus</i>) has had a minor impact on all populations. Grazing may also limit natural recruitment through impacting the establishment of juvenile plants of Gingin wax.
Weed invasion	known current	Weed invasion is a threat to isolated sections of some road reserve populations, although generally invasion was low in 2003. Weeds suppress early plant growth by competing for soil moisture, nutrients and light. They also exacerbate grazing pressure and increase the fire hazard due to the easy ignition of high fuel loads, which are produced annually by many grass weed species.
Disease		
Infection and spread of <i>Phytophthora</i> spp.	potential	Disease is a potential threat, as dieback (caused by <i>Phytophthora</i> spp.) is thought to be spreading through the broader area. Gingin wax appears to be highly susceptible to this plant pathogen and the prevention of the spread of dieback into the habitat of the populations is therefore important. Dieback can also have an indirect impact through degradation of habitat.

Habitat loss, modification and disturbance		
Habitat loss and modification	known past	Road, track, firebreak and fence maintenance activities threaten all road reserve populations and most populations on private property. Threats include grading, chemical spraying, construction of drainage channels and the mowing of roadside vegetation. Several of these actions also encourage weed invasion.
Habitat disturbance	known current	Disturbance of soil from rabbit warren construction, and the increased levels of nutrients and weeds from droppings have affected the habitat of the species.
Trampling by livestock	potential	Trampling by stock may be a potential threat to one of the populations.
Chemical drift	potential	Chemical drift of herbicide and fertiliser applications may affect populations of Gingin wax close to farmland.

Conservation Actions

Conservation and Management priorities

Fire

- Fires must be managed to ensure that prevailing fire regimes do not disrupt the life cycle of the Gingin wax, that they support rather than degrade the habitat necessary to the species, that they do not promote invasion of exotic species, and that they do not increase impacts of grazing/predation. Fire should be excluded until evidence that the soil seed bank has been reconstituted.
- Physical damage to the habitat and individuals of the threatened species must be avoided during and after fire operations.
- If it becomes known that the plant can resprout after fire, avoid successive fire intervals that are shorter than the period required to maintain recovery capacity of resprouting individuals.

Invasive species

- Control grazing by rabbits by the maintenance of current fences and erect new fences as required at known sites, allowing a suitable buffer to contain any regenerating plants.
- Identify and undertake weed control at all locations for weeds that could become a threat to Gingin wax, using appropriate methods.

Disease

- Monitor all Gingin wax populations for presence of *Phytophthora* spp. Where detected, minimise the spread of the pathogen by implementing appropriate vehicle and footwear hygiene protocols where possible, and mitigate impacts with phosphite treatments, fumigants, specific vegetation destruction, and containment barriers where appropriate (Commonwealth of Australia 2014).

Habitat loss, disturbance and modification

- Erect appropriate signage to indicate conservation of individuals or groups of plants. 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.
- Liaise with land managers and land owners to ensure that plants and plant habitat on private and other non departmental land are not accidentally damaged or destroyed.
- Investigate ways and means of improving the security of populations and their habitat.

Breeding, propagation and other ex situ recovery action

- To manage the risk of losing genetic diversity, promote ex situ conservation. Investigate seed germination and propagation from cuttings with Kings Park and Botanic Gardens and the Western Australian Threatened Flora Seed Centre.
- Collect seed and cutting material (species grows easily from cuttings; though means for releasing seed dormancy are not understood) for both long-term storage to guard against possible future extinction and as a source from which to propagate plants for translocation.
- Investigate implementing translocations of Gingin wax in line with the Translocation Proposal, endorsed by the Western Australian Department of Parks and Wildlife's Director of Nature Conservation (see Stack & Brown 2003 for more information).

Stakeholder Engagement

- Fire management authorities and land management agencies should use suitable maps and install field markers to avoid damage to the Gingin wax.
- Land managers (including pastoralists, indigenous communities, IPAs, etc) should be given information about managing fire for the benefit of the Gingin wax.

Survey and Monitoring priorities

- 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 Gingin wax.
- Precise fire history records must be kept for the habitat and extant populations (confirmed and suspected) of the Gingin wax.
- Conduct further surveys for Gingin wax during its flowering period (September - December) to locate any additional occurrences.
- Conduct annual monitoring of threats such as habitat degradation (including weed invasion, plant diseases such as *Phytophthora cinnamomi*), population stability (expansion or decline), pollination activity, seed production, recruitment, longevity and predation.
- Monitor for minor threats such as weeds and rabbits to determine if and when action is required.

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).

Information and research priorities

- Improve understanding of the mechanisms of response to different fire regimes and identify appropriate fire regimes for conservation of the Gingin wax by undertaking appropriately designed experiments in the field and/or laboratory.
- Where appropriate, use understanding and research on fire responses among related (e.g. *Chamelaucium* spp) or functionally similar species to develop fire management strategies for conservation.
- Determine the dynamics of the soil seed bank and the role of various disturbances, competition, rainfall and grazing in germination and recruitment.
- Investigate the pollination biology of the species and the requirements of pollinators.
- Investigate reproductive strategies, phenology and seasonal growth of the species.
- Investigate the population genetic structure, levels of genetic diversity and minimum viable population size.
- Investigate the effect and level of weeds impacting on Gingin wax.
- Determine the impact of dieback disease and control techniques on Gingin wax and its habitat.

References cited in the advice

Brown, A., Thomson-Dans, C. and Marchant, N. (1998). Western Australia's Threatened Flora. Department of Conservation and Land Management. Western Australia.

Commonwealth of Australia (2014). 'Threat abatement plan for disease in natural ecosystems caused by *Phytophthora cinnamomi*'
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Evans, R. and English, V. (1999). Interim Recovery plan number 27, 1999-2002. *Chamelaucium* sp. Gingin. Department of Conservation and Land Management, Western Australia.

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Other sources cited in the advice

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