



SAVING OUR SPECIES

Dwarf Heath *Casuarina*

2022-2023 annual report card

Overall status*

- Populations at all sites are known to be on track.
- Threat management is known to be on track at all sites, and population status is unknown at one or more sites.
- Threat management is known to be off track at one or more sites, and population status is unknown at one or more sites.
- **Populations at one or more sites are known to be off track.**

* For SoS priority management sites (may not include all locations where the species occurs in NSW)

Summary

Management sites	Limeburners Creek; Nabiac; Wallis Island
Action implementation	4 (of 4) management actions were fully or partially implemented as planned for the financial year.
Total expenditure	\$22,246 (\$13,846 cash; \$8,400 in-kind)
Partners	Environment and Heritage Group; The Australian Botanic Garden Mount Annan



Scientific name:
Allocasuarina defungens

NSW status:
Endangered

Commonwealth status:
Endangered

Management stream:
Site-managed species

Photo: Luke Foster

Priority management site: Limeburners Creek

<p>Local government area: Kempsey; Port Macquarie-Hastings</p> <p>Partners: None</p>	<p>Population outcome</p> <ul style="list-style-type: none"> ● On track ● On track (inferred) ● Not on track (inferred) ● Not on track <p>The species population is inferred to be on track based on threat management being on track. The population trend is unknown at this time.</p>
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Monitoring

Species population monitoring by one or more methods indicates response to management over time and provides an outcome measure.

Monitoring metric	Species abundance
Annual target	Confirm presence of species.
Long term target	Track species abundance / condition over time
Monitoring result	Not applicable
Scientific rigour of monitoring method	Not applicable
Conducted by	Environment and Heritage Group

Management actions

The following actions are those identified as being required in financial year 2022-2023 to secure the species in the wild.

Threat	Management action	Implemented as planned?
Limited knowledge of extent or number of populations.	Confirm presence of species at site.	Partial implementation - dependent on other component

Threat outcome

Assessment on the status of critical threats at this site.

Threat	Annual target	Threat status
Limited knowledge of extent or number of populations.	Presence/absence of the species at the site is confirmed via genomic analysis.	On track

Site summary

The Limeburners Creek National Park population is currently being examined. Originally, the population was determined as *Allocasuarina defungens*. However, re-examination of specimens by Rose et al. (2014) considers the specimens to be *A. defungens* x *A. littoralis* hybrids or *A. thalassoscopica*. Further investigation of the Limeburners Creek population is required to confirm the presence of pure *A. defungens*, and thus the northern limit of the species. Sampling to re-examine the population was undertaken as part of this project and genomic analysis of these samples are underway.

Citations:

Rose P. F., Wilson K. L., Telford I. R. H., Lamont R. W. & Bruhl J. J. (2014) Multiple lines of evidence clarify limits of *Allocasuarina thalassoscopica*, *A. defungens* and *A. littoralis* (*Allocasuarina* sect. *Cylindropitys*, Casuarinaceae). *Australian Systematic Botany* 27:4257-81

Priority management site: Nabiac

Local government area:
Mid-Coast

Partners:
Environment and Heritage Group; The Australian Botanic Garden Mount Annan

Population outcome

-  On track
-  On track (inferred)
-  Not on track (inferred)
-  Not on track

Monitoring

Species population monitoring by one or more methods indicates response to management over time and provides an outcome measure.

Monitoring metric	Species abundance
Annual target	Abundance of plants per m2 equal to or greater than 2014 estimate of 0.078 plants per m2
Long term target	Maintain or improve population at 2014 estimates, that is an increase from 0.078 plants per m2
Monitoring result	The majority of plots (65%) showed an overall decrease in the number of plants recorded in 2021 compared to 2014. Differences ranged from 20 to -72 individuals and percentage decline ranged from 500% increase to 100% decrease per plot. Plots in the twice burnt fire history group (Q16-20) recorded a consistent increase in plant numbers. Plot Q3 and Q19 did not change between 2014 and 2021. A total of 624 plants (0.078 plants per m2) were recorded in 2014 compared to 509 plants (0.064 plants per m2) in 2021. The results of the new population estimate method calculated a total population size of 18,266 plants within 63.9 hectares of available habitat, providing a value of 0.028 plants per m2.
Scientific rigour of monitoring method	High
Conducted by	Environment and Heritage Group

Investment

Participant	Cash	In-kind
Environment and Heritage Group	\$13,846	\$800
The Australian Botanic Garden Mount Annan	\$0	\$7,600

Management actions

The following actions are those identified as being required in financial year 2022-2023 to secure the species in the wild.

Threat	Management action	Implemented as planned?
Inappropriate burning which does not allow regeneration of the species.	Continue discussions with stakeholders.	Yes
Inappropriate burning which does not allow regeneration of the species.	Collect seed from all populations. Minimum 1000 seeds per population.	Conducted, but not as planned - Seeds were collected from the Nabic site in 2023; however, the viability of seeds collected was significantly low. Further investigation into the reasons behind the low viability will be explored.

Threat outcome

Assessment on the status of critical threats at this site.

Threat	Annual target	Threat status
Inappropriate burning which does not allow regeneration of the species.	Gather baseline data on post-fire recovery.	Baseline data collection

Site summary

The data collected between 2021 and 2023 at Nabic suggests that the population of *Allocasuarina defungens* is declining. The cause of this decline is unknown; however, it is hypothesised that too-frequent fire is a major factor. To date there is very little empirical evidence on how fire effects *A. defungens*; however, being the key threat identified at the Nabic site, clearly, long-term monitoring in relation to fire frequency, intensity and season (fire regime) is crucial for the species' long-term survival. Unauthorised access causing uncontrolled bushfire is one of the greatest threats imposed on the Nabic population. In the last decade the Nabic sand barriers have been burnt 3 times which is more frequent than what is prescribed for similar species.

The introduction and trial of a new monitoring/population estimate method was a success this year. Further comparison of the 2 methods will be undertaken in 2023 to determine which method will continue as the preferred method.

In terms of threats, weeds are typically considered incompatible with the nutrient-poor wallum habitat where *A. defungens* occurs. However, monitoring of access roads will be required to ensure nutrients aren't brought into these habitats during routine roadside maintenance.

Actions are planned for 2023-24 around seed collection, monitoring populations and fire regimes including research about frequency, intensity and season to sustain and/or enhance populations, including genetically distinct populations (for example, Khappinghat population), whilst maintaining ecosystem conditions (for example, soil nutrients) over the long term.

Priority management site: Wallis Island

Local government area: Mid-Coast Partners: None	Population outcome <div style="display: flex; flex-direction: column; gap: 10px;"> <div style="display: flex; align-items: center;"> <div style="width: 15px; height: 15px; background-color: #008000; border-radius: 50%; margin-right: 5px;"></div> On track </div> <div style="display: flex; align-items: center;"> <div style="width: 15px; height: 15px; background-color: #90ee90; border-radius: 50%; margin-right: 5px;"></div> On track (inferred) </div> <div style="display: flex; align-items: center;"> <div style="width: 15px; height: 15px; background-color: #ffa500; border-radius: 50%; margin-right: 5px;"></div> Not on track (inferred) </div> <div style="display: flex; align-items: center;"> <div style="width: 15px; height: 15px; background-color: #ff0000; border-radius: 50%; margin-right: 5px;"></div> Not on track </div> </div>
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Monitoring

Species population monitoring by one or more methods indicates response to management over time and provides an outcome measure.

Monitoring metric	Species abundance
Annual target	Establish baseline abundance of plants per m2.
Long term target	See no decline in numbers or habitat availability.
Monitoring result	The Wallis Island population boundary covers approximately 14 hectares within approximately 19.2 hectares of Dry Sclerophyll Shrubland confined within bounds of the Nature Reserve. Bootstrapping calculated a mean density of 0.25 plants per plot (95% CI 0.09 and 0.50). A total population size of 105 plants (95% CI 37.8 and 210) occurs within DSS in the population boundary giving a value of 0.0025 plants per m2.
Scientific rigour of monitoring method	High
Conducted by	Environment and Heritage Group

Management actions

The following actions are those identified as being required in financial year 2022-2023 to secure the species in the wild.

Threat	Management action	Implemented as planned?
Limited knowledge of extent or number of populations.	Finalise surveys.	Yes

Threat outcome

Assessment on the status of critical threats at this site.

Threat	Annual target	Threat status
Limited knowledge of extent or number of populations.	Define Area of Occupancy for Wallis Island.	On track

Site summary

Targeted surveys of Wallis Island identified 19.2 hectares of suitable habitat for *Allocasuarina defungens*. Of this, approximately 14 hectares were found to contain plants. Analysis calculated a mean density of 0.0025 plants per m² and a population size of 105 plants (95% CI 37.8 and 210). These values will now be used as the established baseline for future monitoring. No fruiting plants were observed in plots despite the apparent old age of some individuals. Wallis Island has not been burnt for many decades which may explain the lack of plants with seed-bearing cones.

Surveys have identified inappropriate fire regime is the most significant threatening process to *A. defungens*; however, the most appropriate fire frequency and intensity for *A. defungens* populations requires further investigation.

The Booti Booti and Wallis Island population is relatively small and occupies a discrete area of habitat which does raise concerns regarding risks of local extinction from stochastic events.

The next step for Wallis Island is to collect seed for storage within PlantBank.

Saving our Species 2022-2023 annual report card for Dwarf Heath Casuarina (*Allocasuarina defungens*). For more information refer to the specific strategy in the Saving our Species program.