Northern Rivers Region – National Parks and Wildlife Service New South Wales

Saving Our Species (SOS) - Site Managed Species Project

Results of Population Surveys and Threat Assessments for:

Owenia cepiodora F.Muell. (Meliaceae)

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Property Owner: Don Durrant; Ettrick via Kyogle, NSW 2474

Cover photograph: Drier rainforest habitat with *Owenia cepiodora*, Ettrick, via Kyogle northern New South Wales. Araucarian Notophyll Vine Forest.

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Onion Cedar - *Owenia cepiodora* F.Muell. (Meliaceae)

Introduction

The species primary habitat is described in Floyd (1989, 2008) as the *dry Hoop Pine rainforests* (Araucarian Notophyll Vine Forest – ANVF; Webb 1959, 1968) of the northern NSW and Queensland border region. The area surveyed here and described as 'the property' owned and managed by Don Durrant is dominated by that forest type (Fig. 1; Appendix 1).

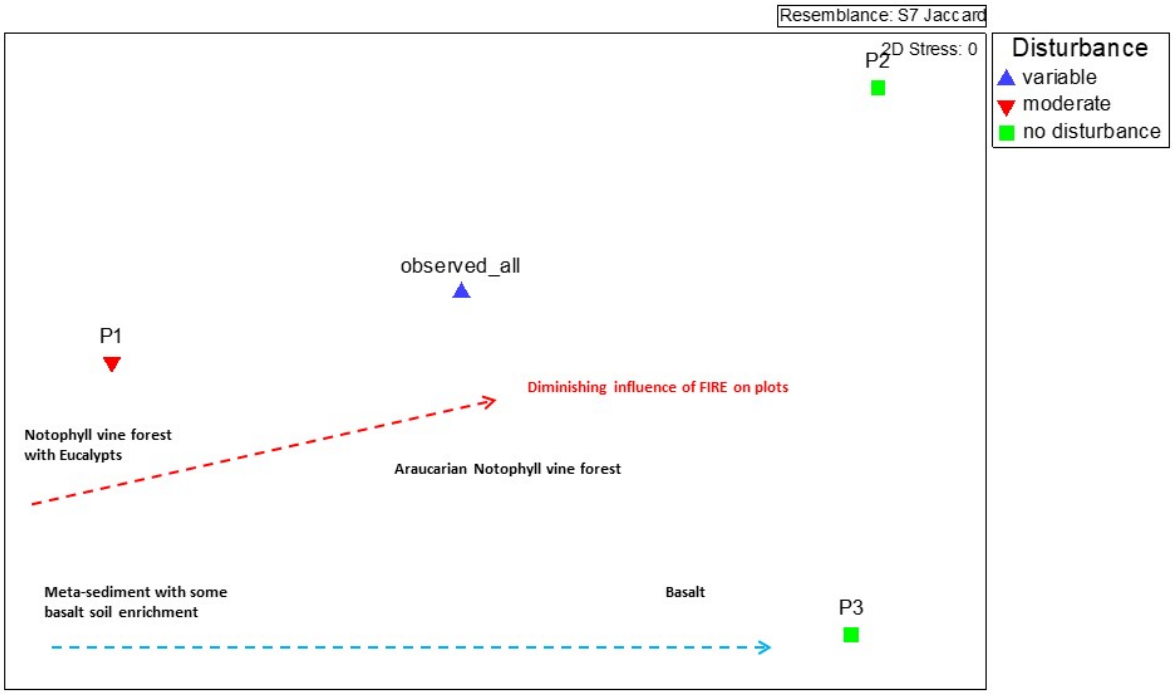

Figure 1. Non-metric multidimensional scaling ordination of three (P1-P3) permanent plot samples (50x20m) based on woody species (trees, shrubs, vines), ranked (1-6) abundance weighting (modified Braun-Blanquet), and the Jaccard resemblance measure. Relative level of disturbance is colour coded by site, while the direction of decreasing disturbance and fire influence (red arrow) and increasing dominance of basalt soils (blue arrow) are shown as dotted lines.

Implications of life history

In larger populations such as this one at Ettrick, seedlings and saplings are more common, and are often in relatively close proximity to adults. This results in a patchy distribution and suggests some level of dispersal limitation. There is little support for 'Janzen-Connell effects' (Janzen 1970; Connell 1971) that have been suggested as potentially limiting the occurrence of recruits (seedlings and saplings) of rainforest species close to parent trees.

Seed crops can be irregular, but most large stems produce a decent crop once every two years. Seeds were collected in 2018 for the translocation component of the SoS project in the Nightcap NP population. Fruits are red when ripe, with fleshy white pulp, and a hard endocarp that generally has two (to four) cells and two seeds (in total). Germination rates of collected seed to date has been low, and the species is known to be difficult to propagate. However, the property owner on this site (Don Durrant) has successfully collected, germinated and grown *Owenia cepiodora* as part of rainforest restoration actions. Seed predation in the canopy is minimal, while once on the ground seeds are eaten by Bush Rats. Seed dispersal vectors are unknown but it is assumed they include volant dispersers.

Disturbance

More broadly, disturbance (both anthropogenic and natural) remains as a major threat to the species; both directly by damage to stems (for example, recent logging operations in Cherry Tree SF) and indirectly by habitat modification and the invasion of weeds. In this location the primary source of possible disturbance is by uncontrolled fires impacting the rainforest, or natural tree-falls. Given the population size treefall has to be regarded as a relatively low level threat. There are no existing threats from invasive weeds, other than *Lantana camara* along the edge of the rainforest and in some gaps. The issue of removal of Lantana needs to be balanced in relation to its role as important retreat habitat for several threatened terrestrial vertebrates known from the property, including Black-striped Wallaby (*Macropus dorsalis*), Red-legged Pademelon (*Thylogale stigmatica*) and Long-nosed Potoroo (*Potorous tridactylus*). Other terrestrial species such as Bandicoots (*Perameles nasuta* and *Isoodon macrourus*) are known from this location, and the area.

Fire

Across the species range both individuals and populations occur near and adjacent to wet and dry sclerophyll vegetation dominated by species in *Eucalyptus*. This proximity lifts the level of threat from both wildfire and controlled (hazard reduction) burns. In all cases, it should be a priority to list *Owenia cepiodora* and its habitat as an asset to be protected from fire.

Fire Planning

Robert Kooyman and Jane Baldwin (FABCON and Border Ranges Alliance) have undertaken a fire planning assessment and identified (and mapped) key assets and infrastructure including roads and access points. The property management strategy and planning for fire is based on the expansion of rainforest vegetation into nearby areas of pasture and eucalypt forest, and the control (removal) and replacement of Lantana with rainforest regeneration and plantings. In combination these actions will protect and buffer the core rainforest areas from fire.

Actions that reduce the extent of rainforest species distributions in adjacent forest types (e.g., burning of moist sclerophyll Eucalypt forest) can be considered to be destructive of the maintenance and survival of regional rainforest diversity, and a threat to this species. Fire

should be excluded from the species habitat and areas directly adjacent. None of the component flora and fauna (of the rainforest - eucalypt edge assemblages) in this area are threatened by long fire intervals or rainforest expansion (see for example, Florence 1963). In contrast, the target species and its habitat are threatened by fire. Light patch burning of drier sclerophyll communities in exposed areas away from the rainforest could be undertaken strategically to reduce fuel loads (refer to Fire Plan).

Disease, pathogens and other threats

No disease or pathogens on this species were detected during these surveys and inspections. No additional weed incursions or threats from weeds were detected. Extensive and highly successful control actions for *Lantana camara* were undertaken over the last year, including in, and adjacent to the habitat of *Owenia cepiodora*.

Evidence of the effects of degrading land-use practices

In relation to this property, there is now a substantial history of landowner effort to protect and conserve the rainforest and other forest habitats. These efforts have intensified with the recent funding of actions (under the SoS program) to control weeds and enhance conservation efforts. The legacy of past actions, including selective logging, the clearing of land up to the edges of the rainforest in some locations, the establishment of weed species (including Lantana), and the extensive clearing of adjacent properties could all be described as 'degrading land-use practices'. All such practices on the property have been controlled and are actively being ameliorated by targeted conservation actions, including weed control, exclusion of cattle grazing, fire planning, and tree planting and natural regeneration management to expand the area of forest and rainforest buffers.

Site monitoring - permanent photographic points

Site sampling (plot-based) was established in 2017 to enable monitoring of *Owenia cepiodora* and other vegetation components, with permanent photographic points established in all (three) locations (Figure 1; Appendices 1 and 2).

The outcome of 12 months demographic monitoring of *Owenia cepiodora* shows that the species is stable in this population. In total: of the 81 stems being monitored there was one mortality (of a seedling); two saplings were hit by a falling tree; and two seedlings were in decline (showing leaf loss). Conditions were very dry.

Estimation of *Owenia* numbers and abundance

Table 1 and Appendix 1 provide details of size class distributions on plots and extrapolations across the extent of habitat on the property.

Table 1. Number of *Owenia cepiodora* in diameter size classes in three Permanent Plots (PP1-PP3; AMGs; 50x20m) and one non-permanent sample; extrapolated to numbers per hectare and estimated number across property.

		0-1cm	1-2cm	2-5cm	5-10cm	10-20cm	20-30cm	30-50cm	>50cm
	487419_6835156	15	12	2		1		2	
PP1	487024_6834735	42	12	21	16				1
PP2	487676_6834421	14	13	14	1		1	2	
PP3	487874_6834401	5	1		4	1		6	4
	Totals for 0.4 ha sampled	76	38	37	21	2	1	10	5
	Nos. per hectare in habitat	190	95	92.5	52.5	5	2.5	25	12.5
	Estimated sample size = 20%								
	Estimated total population	950	475	462.5	262.5	25	12.5	125	62.5

Knowledge Gaps

Dispersal. Seed germination. Recruitment. Seedling and sapling persistence. Genetic structure and diversity relative to isolation and distance.

Reproduction and fecundity

Pollination rates, parameters for reproductive output (number of fruits per unit area), and percentage germination have not been determined for these locations or for the species more generally.

Demographics

Demographic data is now available for the species and shows that the species is stable on this site. The species is present on plots established as part of this project and the opportunity exists to continue monitoring growth, survival and recruitment through time. The population structure represented in Table 1 is typical of mature phase (shade tolerant) rainforest trees.

Strategies to mitigate threats to *Owenia cepiodora*

- Exclude fire from rainforest and all sclerophyll and rainforest edge habitats. Protect reproductively mature individuals of the species (*Owenia cepiodora*).
- Implement fire planning strategy and continue expanding rainforest.
- Monitor weed species growth and distribution. Continue weed control.
- Support research to determine the genetic structure and diversity of *Owenia cepiodora*, the population (demographic) structure of the species, and how within species diversity is spread in relation to the species distribution.

Additional surveys were undertaken in suitable habitat to identify any previously unidentified stems or populations of the species (Appendix 1).

Threatened Species known from or possible in the habitat of *Owenia cepiodora*

Table 1. FLORA

Species	Family	TSC Act	ROTAP
Owenia cepiodora	Meliaceae	Sch 2	
Tinospora smilacina	Menispermaceae	Sch 1	
Plants of interest or of restricted distribution			
Pittosporum viscidum	Pittosporaceae	SEQLD	

Table 2. FAUNA

Scientific Name	Common Name	TSC Act	EPBC Act
Coeranoscincus reticulatus	Three-toed Skink	V	V
Hoplocephalus stephensii	Stephen's Banded Snake	V	
Carterornis leucotis	White-eared Monarch	V	
Ptilinopus magnificus	Wompoo Fruit-Dove	V	
Ptilinopus regina	Rose-crowned Fruit-Dove	V	
Ptilinopus superbus	Superb Fruit-Dove	V	
[x]*Cyclopsitta diophthalma*	Double-eyed Fig Parrot	CE	E
Ninox strenua	Powerful Owl	V	
Tyto tenebricosa	Sooty Owl	V	
Podargus ocellatus	Marbled Frogmouth	V	
Miniopterus australis	Little Bent-winged Bat	V	
Miniopterus schreibersii oceanensis	Eastern Bent-wing Bat	V	
Scoteanax rueppellii	Greater Broad-nosed Bat	V	
Nyctophilus bifax	Eastern Long-eared Bat	V	
Kerivoula papuensis	Golden-tipped Bat	V	
Syconycteris australis	Eastern Blossom-Bat	V	
Nyctimene robinsoni	Eastern Tube-nosed Bat	V	
Pteropus poliocephalus	Grey-headed Flying Fox	V	V
Dasyurus maculatus	Spotted Quoll	V	
Planigale maculata	Common Planigale	V	
Phascolarctos cinereus	Koala	V	V
Potorous tridactylus	Long-nosed Potoroo	V	V
Macropus dorsalis	Black-striped Wallaby	E	
Macropus parma	Parma Wallaby	V	
Thylogale stigmatica	Red-legged Pademelon	V	

x extinct

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Appendix 1: size class distribution on plots, and list of tagged stems by plot; Species list (species encountered on this survey), and permanent plot floristics.
Appendix 2: Permanent Plot Photo Points.