Green-leaved Rose Walnut Rehabilitation Plan – W2B Project, Section 4. Monitoring Report (June 2023 - May 2024)

Prepared for:

Goldings, PO Box 1643, Milton QLD 4064

Prepared by:

Ecos Environmental (Dr Andrew Benwell)
PO Box 641, Mullumbimby NSW 2482

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Introduction

As part of threatened flora management for the W2B project, a Rehabilitation Plan was prepared in 2019 to carry out remediation works for the endangered species Rusty Green-leaved Rose Walnut (RGRW)(*Endiandra muelleri* subsp. *bracteata*) at the southern Maclean exit, on Section 4 of the W2B project. The remediation plan titled *Green-leaved Rose Walnut Rehabilitation Plan – W2B Section 4* was prepared by Geolink and Ecos Environmental (1/4/2019, updated 10/12/2019). The plan describes methods for translocating Rusty Green-leaved Rose Walnut to a recipient site in the road reserve adjoining the southern Maclean interchange, close to where an in-situ tree of this species was accidentally cleared during highway construction. The Rehabilitation Plan is an addendum to the Woolgoolga to Ballina Flora Translocation Strategy (RMS 2015) and was approved by NSW Planning, Industry and Environment on 1 May 2020.

This is the fourth monitoring report on implementation of the Rehabilitation Plan and the third since RGRW seedlings were planted into the recipientsite in January 2021.

Monitoring reports prepared to date include:

- Ecos Environmental (27/10/2020 – pre-introduction progress of seed collection and propagation, site preparation). *Annual Report (April 2019 to July 2020) Green-leaved Rose Walnut Rehabilitation Plan – W2B Project, Section 4*. Prepared for NRW (formerly BGC) Contracting Pty Ltd.
- Ecos Environmental (3/9/2021). *Green-leaved Rose Walnut Rehabilitation Plan – W2B Project, Section 4. Annual Monitoring Report (July 2020 – August 2021).* Prepared for: NRW (formerly BGC) Contracting Pty Ltd
- Ecos Environmental (2/6/2023). *Green-leaved Rose Walnut Rehabilitation Plan – W2B Project, Section 4. Monitoring Report (August 2021- May 2023).* Prepared for Golding.

The following sections of this report described the methods and results of Green-leaved Rose Walnut Rehabilitation Plan up to May 2024.

Methods

The translocation was carried out by propagating Rusty Green-leaved Rose Walnut (*Endiandra muelleri* subsp. *bracteata*) from seed collected near Wardell south of Ballina on Section 10 of the W2B project and introducing seedlings to a cleared site adjoining remnant forest next to the South Maclean interchange.

Site rehabilitation work has also been carried out at a single, in-situ individual of Rusty Green-leaved Rose Walnut (RGRW) located in the road reserve on the eastern side of the highway about 400 m north of the translocation site.

The Rehabilitation Plan has involved the implementation of 4 Actions:

Action 1 – 2019-2020.
Targeted surveys for RGRW in the Maclean area to assess local extent of species and to collect seed or cuttings for propagation (2019-2020)
Action 2 – 2020.
Collection and propagation of seedlings/cuttings (sourced north of Maclean as the local survey was unsuccessful in finding more plants of RGRW)
Action 3 – 2021-2024.
Introduction of propagated RGRW and associated habitat plantings to recipientsite adjacent to Maclean interchange and follow-up maintenance - Management Zone 1
Action 4 – 2021-2024
Control of invasive exotic species at the in-situ RGRW location in the road reserve to the north - Management Zone 2.

This recipient site is a few metres from the original in situ location of the cleared RGRW tree. The soil at the recipient site formed on sedimentary geology (siltstone and sandstone) and very low in nutrients, although there is some increase at the base of slopes and where forest is protected from fire. Regular maintenance including weed suppression and annual application of mulch and slow-release fertiliser (General Purpose for Landscaping, 6-9 months from Bunnings) was considered essential if the seedlings were to establish successfully.

Maintenance, monitoring and reporting of the translocation results is required for a minimum of five years under the W2B Threatened Flora Translocation Strategy (RMS 2015). This is considered the

minimum length of time necessary if RGRW is to establish and have a reasonable chance of persisting unassisted at the at the recipient site.

The recipient site covering approximately 30 m x 20 m was prepared for introduction of RGRW by spraying exotic species at the site including Crofton Weed (*Ageratina adenophorum*), Broad-leaved Paspalum (*Paspalum mandiocanum*) and Vasey Grass (*P. urvillei)* with Round-up Bio-active (frog friendly) and installing a wire mesh fence to demarcate the translocation area and deter wallaby grazing.

In January 2021, twelve seedlings of RGRW approximately 18 months old, with an average height of 40 cm were planted in the recipient site. Heavy rain had fallen and most of the site was covered by shallow standing water, except for the northern side at the base of the hillslope. After the heavy rain it was obvious the flat part of the site was unsuitable microhabitat for RGRW and seedlings would have died from extended soil waterlogging. Points for planting were checked by examining if groundwater filled holes. Along the northern boundary holes didn't fill up with ground water indicating adequate soil drainage. The seedlings were mulched with cane mulch and chicken wire tree guards installed around each plant.

The locations of planted RGRW were recorded with a gps and tagged plants monitored to record survival, plant height and condition, including new growth, grazing by mammals or insects, and symptoms of disease. Habitat condition was also recorded including soil moisture, sun and wind exposure and competition from exotic and native species that may have be suppressing RGRW. Monitoring reports would be prepared each year.

Results and Discussion

Action 2 - Seed collection and propagation

As surveys did not find any more RGRW trees in the Maclean locality, seeds were collected from a known population of RGRW within the project boundary near Coolgardie Rd, Wardell, on Section 10 of the W2B project in late 2019.

The small quantity of seed was germinated successfully, and 12 seedlings transferred to pots and grown at the nursery for approximately 18 months. Seedling plants needed to be a good size with root systems well developed before planting out to achieve a high survival rate.

The seedlings are likely to be very similar genetically to the Maclean population as the Wardell population is the closest RGRW population to the Maclean site. No obvious differences in leaf morphology or other morphological traits were evident between the two locations.

Action 3 – Management Zone 1 (translocation recipientsite) - introduction of propagated RGRW

By May 2024, three years and four months after introduction, the survival rate of RGRW was 100% and plants were in good condition, although growth was very slow, which reflects the low fertility soil and the species' inherently slow growth rate. Seedlings increased in height from a mean of 0.94 ± 0.08 cm in May 2023 to 1.06 ± 0.10 cm in May 2024, an increase in mean height of approximately 6 cm. This is similar if slightly less than growth at the previous monitoring, which was for a two-year period (2021-2023). Leaf yellowing recorded last year had largely disappeared and leaves were a healthy green. This was likely a response to cane mulch and slow-release fertiliser applied last year and good growing conditions (i.e. good rain, no prolonged dry periods). The very slow growth rate emphasises the need for a minimum 5-year maintenance period if the plants are to survive and continue growing.

Table 1: Height and condition of twelve Rusty Green-leaved Walnut (*Endiandra muelleri s*ubsp. *bracteata*) introduced to the recipient site in 2019. Ns – new shoots

Waypoint	Co-ordinates (GDA, decimal minutes)	Height (m) 2021	Height (m) 2023	Height (m) 2024	Plant Condition May 2024
192	S29 28.169 E153 12.359	0.5	0.56	0.82	leaves green, new shoots
193	S29 28.172 E153 12.355	0.6	0.6	0.64	Leaves ok, no ns
194	S29 28.171 E153 12.353	0.9	1.11	1.07	Leaves ok, no ns
195	S29 28.171 E153 12.351	0.6	0.78	0.84	leaves ok, new shoots
196	S29 28.172 E153 12.351	0.7	0.8	0.85	leaves green, no ns
197	S29 28.174 E153 12.349	0.8	0.94	1.12	leaves green, no ns
198	S29 28.177 E153 12.349	1	1.6	1.78	leaves green, new shoots
199	S29 28.177 E153 12.350	0.6	0.77	0.91	leaves green, new shoots
200	S29 28.178 E153 12.349	0.6	0.92	1.16	leaves green, new shoots
201	S29 28.177 E153 12.347	0.9	1.3	1.62	leaves green, new shoots
202	S29 28.174 E153 12.346	0.9	0.97	0.97	leaves green, no ns
203	S29 28.176 E153 12.344	0.5	0.82	0.91	leaves green, no ns
	Mean height (m) (± standard error)	0.72 ± 0.05	0.94 ± 0.08	1.06 ± 0.10	

Action 4 – Management Zone 2 (in-situ RGRW site) – vegetation management

A single RGRW sapling occurs in-situ (naturally) within the road reserve on the eastern side of the highway a few hundred metres north of the translocation site.

A dense infestation of the exotic vine Dutchmans Pipe (*Aristolochia elegans*) at this site poses a significant threat to the RGRW sapling by smothering. Weed control carried out by Ecos Environmental involved spraying Dutchmans Pipe with glyphosate and metsulfuron (Brush-off). The cut-and-paint method was not applied as copious white sap exuded by cut stems of the vine is reported to be highly toxic and a serious health hazard. Other exotics including three species of Asparagus Fern and Lantana were also sprayed.

Weed control work has substantially reduced the density of Dutchmans Pipe within 10-15 m of the RGRW sapling, however, a large area of the vine extends out 20-30 m, possibly more as it is spreading. The RGRW sapling is in good condition and has increased in height since management began.

Proposed Work Schedule 2024-25

Action	**Dates 2024-2025**
Maintenance	
Management Zone 1 • Control grass and weed growth, apply mulch and slow-release fertiliser to plantings	Oct-Nov/24 & May/25
Management Zone 2 • Spray Dutchmans Pipe	Oct/Nov/24 & May/25
Annual Monitoring and Report	May 2025

Plate 1: Rusty Green-leaved Rose Walnut 1.2 m high, May 2024, 3 years and 4 months after introduction and approximately 5 years since seed collection

Plate 2: Rusty Green-leaved Rose Walnut 1.6 m high, May 2024, 3 years and 4 months after introduction and approximately 5 years since seed collection.

Plate 3: Foliage of Rusty Green-leaved Rose Walnut May 2024. Leaves on most plants were a healthy green colour and yellowing was uncommon.

Plate 4: Rusty Green-leaved Rose Walnut recipient site, May 2024. Wire cylinder with RGRW in background. Sheltering regrowth mostly 1.5-3 m high and open so as not to inhibit RGRW growth on the poor soil. Three years and four months after introduction and approximately 5 years since seed collection.

Plate 5: In situ Rusty Green-leaved Rose Walnut in the road reserve north of the translocation area, May 2024. Plant healthy and showing growth after treating Dutchmans Pipe (*Aristolochia elegans*), a densely growing exotic vine, for three years. Inset - close-up of RGLW leaves, May/2024.