

Monitoring and assessment of revegetation on Preston Waters and Hillview properties

A report to Carbon Neutral Pty Ltd



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Andrew Del Marco of Ironbark Environmental is a Certified Environmental Practitioner (CEnvP 606) and Member of the Environment Institute of Australia and New Zealand. The EIANZ/CEnvP Code of Ethics and Professional Conduct is available from <https://www.eianz.org>



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All photos credits Andrew Del Marco, June 2020.

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1. Introduction

The purpose of this document is to provide monitoring and assessment of revegetation on the **Preston Waters** and **Hillview** properties.

The Preston Waters and Hillview Properties are located in WA's Midwest Region, in the Shire of Morawa, north of the Morawa townsite (Figure 1). Preston Waters is located in Shire's East Canna District, while Hillview is located in the Gutha District, approximately 7 km east of the Mullewa-Wubin Road.

The properties form part of the Yarra Yarra Biodiversity Corridor, a reforestation restoration project supported by numerous organisations including Carbon Neutral and the Carbon Neutral Charitable Fund.

- In most cases the vegetation under assessment was direct-seeded or planted between 2010 and 2012 and so has been under establishment for eight to ten years.
- Main species present are Eucalyptus, Acacia, Melaleuca, Atriplex (Saltbush).

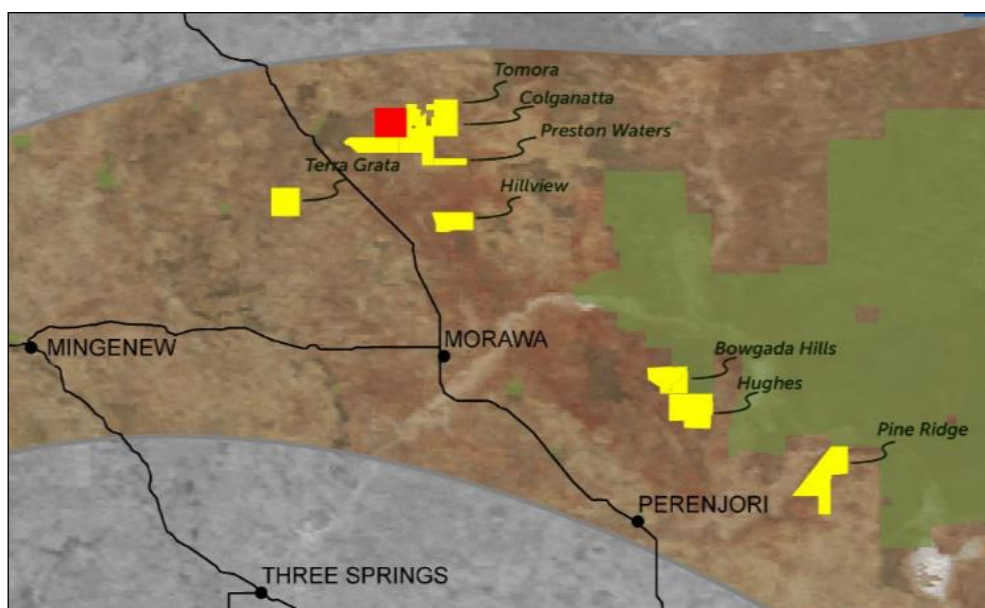


Figure 1: Location Preston Waters and Hillview properties

All fieldwork was carried out by Andrew Del Marco on 29 – 30 June 2020. Weather conditions were mild and generally overcast. Unrestricted access was provided to all parts of the study area.

2. Preston Waters

2.1 Revegetation areas under assessment

The Preston Waters study area covered all revegetation. The assessed revegetation areas total approximately 702.9 hectares.

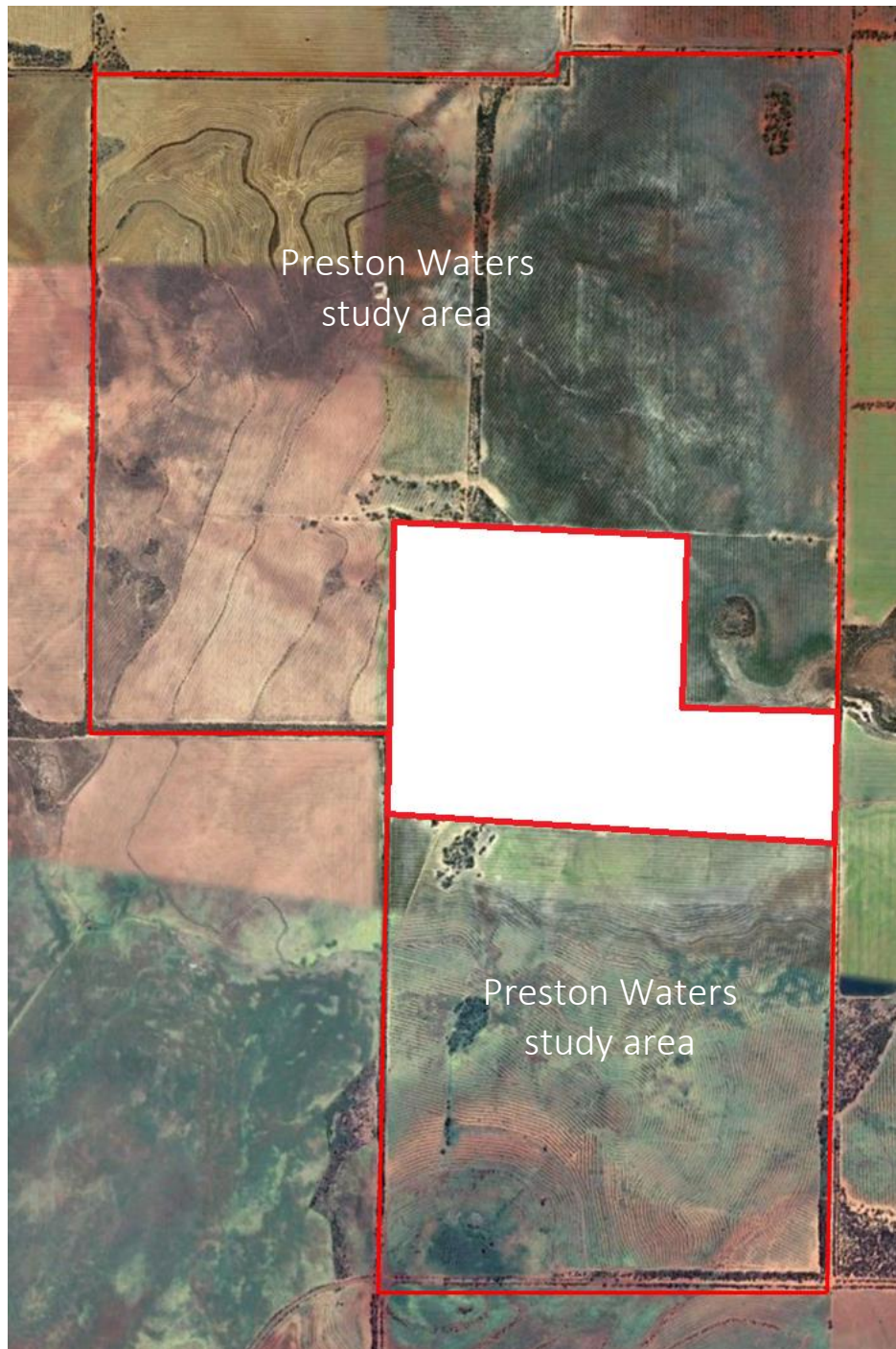


Figure 2: Areas of revegetation under assessment on Preston Waters total 702.92 ha.

- Preston Waters is lightly undulating, with slightly elevated areas in the central north-western and southwestern areas (elevation up to 350m above sea level).

- Mixed species revegetation began in 2011 and further planting taking place in 2012 and 2018. Approximately 702 hectares has now been established with mixed native species endemic to the region, with the direct seeding method used over much of the property.
- 17 species were direct seeded, including 15 x species of Acacia and 2 x species of Saltbush. Additionally, 6 species were hand planted: 3 x Eucalypts, 2 x Acacia, and 1 x Saltbush, (Ruthrmac Pty Ltd, 2018).
- Previous assessments of the site's revegetation have occurred in 2016 and 2018, and have been used in this study (2020) to guide sampling locations and the interpretation of results.

2.2 Monitoring and assessment methods

To determine stocking rates and describe vegetation condition, plots were established across the site.

For each plot:

- Main genera were recorded (Eucalyptus, Acacia, Atriplex, Santalum).
- Average vegetation height was estimated
- A waypoint was established of the plot centroid.

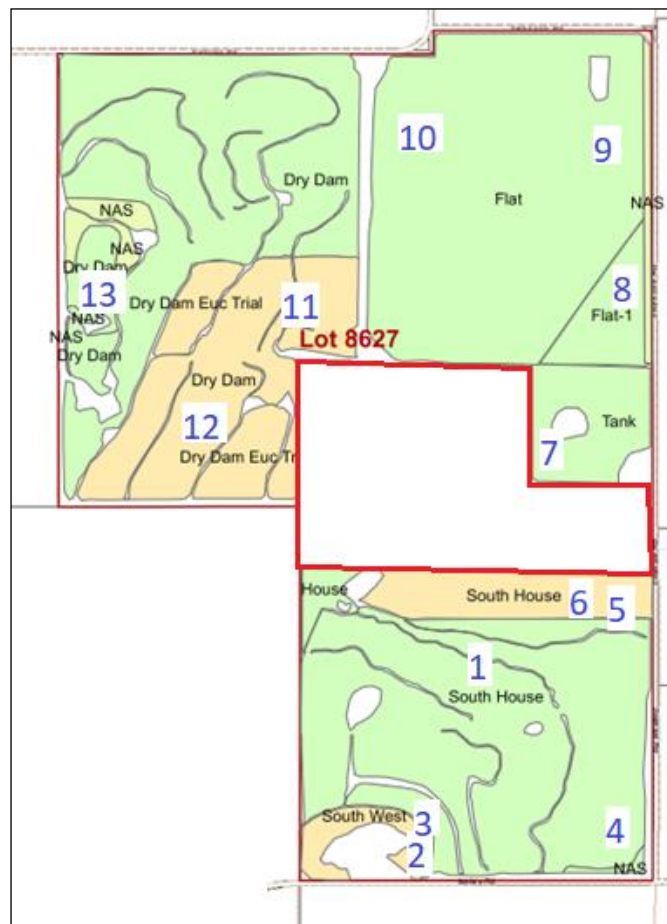


Figure 3: Location of plots used in 2020 at Preston Waters.

2.3 Results and discussion

- In general, the vegetation across all plots was in moderate to high densities and healthy and in good condition. The only exceptions were Plots 2 and 5, which represented small portions of the South West and South House Blocks respectively.
- The site is dominated by non-Eucalyptus species, predominantly species of Acacia, complemented by Atriplex, Santalum, and Melaleuca species.
 - On average across all plots, 92.5 % of stems are non-eucalypts and 7.5% Eucalypts.
- The success of direct seeding of Acacias and other shrubs is the most noticeable feature across the site.
- It is estimated that across the 702.9 ha site, there are at least 1,196,153 stems, including 38,444 Eucalypts and 1,157,709 other species.
 - This estimation is lower than the 2017/18 survey by Ruthrman, where it was estimated that the site carried approximately 2,000,000 stems. Decreases in overall stocking over the first 8 years of establishment is to be expected as plants on direct seeded lines compete for water and resources.
- Some portions of the property have low densities due to poorer soil conditions, but these areas are localised and represent a relatively small portion of the property.

Flat Block, vegetation in very good condition.



Moderate to good condition vegetation, showing diversity with sandalwood.



Tank Block, moderate to good condition vegetation.



Eucalyptus trials at Dry Dam. Good survival of planted eucalypts, and healthy direct seeded vegetation.



3. Hillview

3.1 Revegetation areas under assessment

On the Hillview property, the assessed area **Location 1804** is a 64.75 ha land parcel on the south west corner of the property, bounded by Bell and Muthingootha Roads (Figure 3).

The revegetated area is approximately 61 ha.

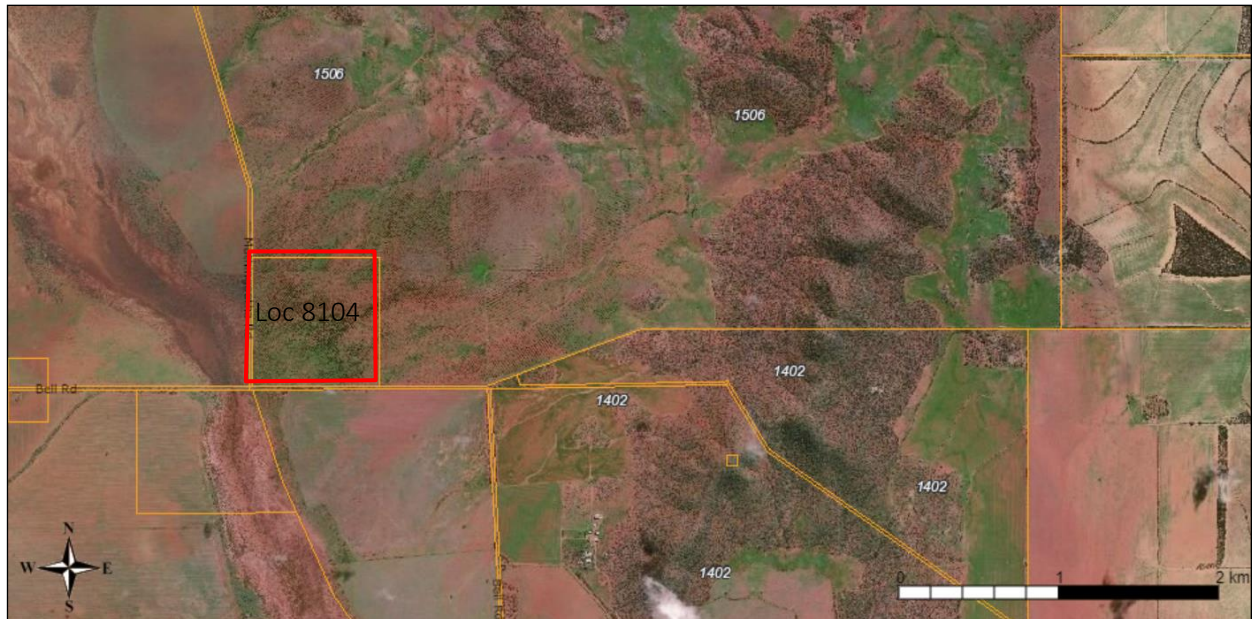


Figure 4: The study area, north west of the intersection of Bell and Muthingootha Roads, Morawa, and forms part of the Hillview property (WALGA, 2020)

- The vegetation on lot was established in winter 2010 with the site prepared on a series of 13 m sets – each set includes 2 scalped, shallow ripped rows 3 m apart and a 10 m inter-row space.
- Direct seeding took place along the rows at a rate of 500 grams of seed/ha and seedlings were planted along the rows at approximately 4 m apart.

3.2. Monitoring and assessment methods

- Transects were sampled across the site. The transects were based on a series of 50 m or 100 m sections along planting rows across the site.
- Stocking densities were calculated for Eucalypts and non-eucalypts for each transect, and then applied and weighted to a representative area of the site.

3.3 Results and discussion

- The vegetation at Hillview is in good to moderate health and density levels.
- Eucalypts health was generally very good, with no sign of insect attack, or leaf discolouration. On average, most eucalypts across the site were at least 2 metres in height, and mostly over 3 metres, with many stems being over 4 metres.
- The most common non-eucalypt species were Acacia and Atriplex, with Hakea occurring in some parts of the site.
 - Grazing by sheep and kangaroos may have limited the further recruitment of native and exotic species across the site over recent years.
- In total, the site is estimated to carry at least 42,331 stems, of which at least 15,503 are eucalypts, and 26,827 are Acacia, Atriplex and other locally native shrubs.
- The total 2020 stocking rates estimated in this study are significantly less than the 89,500 plants that were estimated to be on the site in winter 2012, two years after initial planting and seeding.
 - This reduction in plant numbers over the past eight years may be explained through the loss of plants through natural attrition due to environmental stress and plant competition changes in survey methodology to omit plants under 20 cm in this study.
- Stocking rates across the site varies considerably, with total stocking rates ranging from 220 stems/ha in the far south western corner, through to 1308 stems/hectares in central areas.
 - The south western corner is adjacent to a broad saline flat with extensive native tree death west of Muthingootha Road, likely due to excessive salinity.
- The survey of Hillview Location 8104 also found evidence that the revegetation is providing shelter and food for native fauna species. Opportunistic surveying during the study found a number of nests for birds and insects.

Typical revegetation at Hillview.



North western area at Hillview, showing coverage of Eucalyptus and Acacia species.



Nesting habitat found in Hakea species.



Saline-affected land in proximity to planting property.



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