

Koala Clancy Planting Report

Wurdi

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Disclaimer:

The data used in this report has been compiled from both public and restricted access data sources. The results have been compiled using a rapid assessment and while care has been taken to compile and present the results, an audit of the data has not been undertaken and the Mullion Group does not warrant or guarantee the results. You must not rely on the information in the report as an alternative to specialist advice from an appropriately qualified professional. To the extent permitted by law, the Mullion Group excludes all liability to any person for any consequences, including but not limited to all losses, damages, costs, expenses and any other compensation, arising directly or indirectly from using this publication (in part or in whole) and any information or material contained in it.

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1. Overview

The results presented in this report were developed using the FLINTpro software (<https://flintpro.com/>). The purpose of the report is to provide a rapid assessment of carbon abatement potential in relation to the establishment of forests in the planting area using readily available data. The results presented here are provided in good faith for the purpose of providing an indicative carbon balance for the organisation and are limited by the following:

- The methods are not suited to being used for any regulatory or market (ERF) purpose.
- The carbon estimates rely on simplified assumptions regarding tree growth and carbon flux, and must be viewed as indicative only.
- The carbon estimates rely on high level and publicly available vegetation mapping. This has not been verified for the individual property and may include errors inherent to the vegetation mapping data used.

The results provide an indication of the potential forest carbon stock changes based on FLINTpro that replicates the Australian Government FullCAM model using Australian Government data. While indicative, it is recommended that local data be used to derive more accurate estimates.

The purpose of this report is to demonstrate the capacity to estimate carbon stock and carbon stock change at the project level using a national modelling approach. Similar modelling approaches underpin the existing Emissions Reduction Fund (ERF) and supports land holder activities without needing to undertake expensive field measurements. By moving from a measurement to model based approach, it is possible to dramatically reduce the barriers for understanding the carbon stock and stock change on their properties.

2. Human Induced Regeneration and Carbon Abatement Potential

For this project, the Koala Clancy Foundation has selected approximately 14.9 hectares for regeneration. It is assumed that the entire selected area was without tree cover prior to 2020 and will transform into forest as a result of the planting. The potential carbon sequestration will differ depending upon the particular forest type that is planted or established, as the types are accompanied by different growth regimes. There are two types of growth regimes present in the selected planting area, belt planting and riparian planting (Figure 1).

The results from this assessment show an estimate of the carbon abatement potential that the Koala Clancy planting area is likely to have for these project models. The assessment has been prepared on the assumption that trees were planted in the year 2020, and the results indicate that in 2050, the property had a mean abatement potential of approximately 103.1 tC ha⁻¹ (Figure 2). This abatement potential consists of 58.2 tonnes of carbon (tC) ha⁻¹ in the Above Ground Biomass (AGB), 24.2 tC ha⁻¹ in the Below Ground Biomass (BGB), and 20.7 tC ha⁻¹ in the Dead Organic Matter (DOM). The total carbon abatement potential of the planting area through time is shown in Figure 3. The respective amount of CO₂ captured by the planting can be estimated by multiplying the carbon values by 44/12 (~3.67). Abatement potentials for the period 2020 to 2100 are shown in more detail in Table A1 in the Appendix.

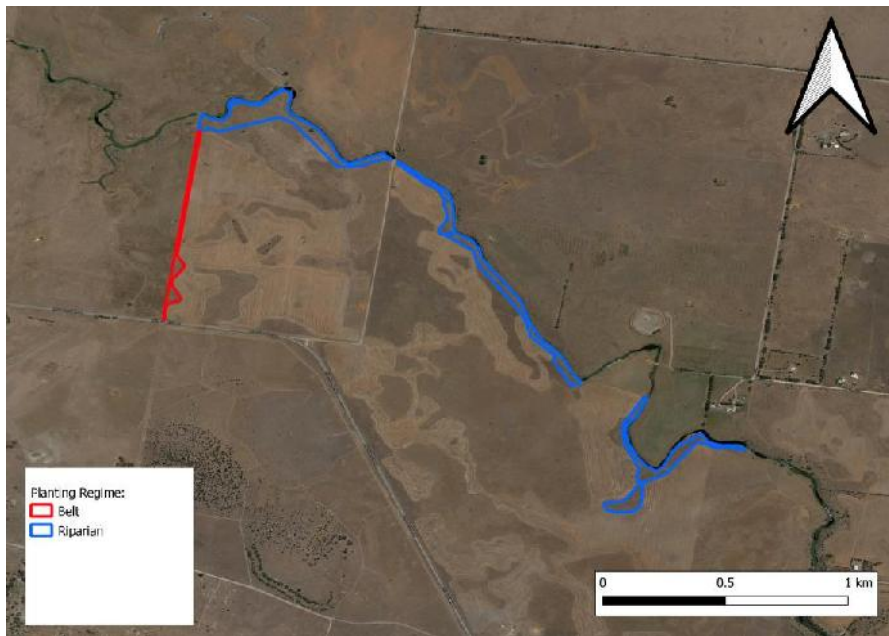


Figure 1 – Map of selected planting areas, divided into planting regimes (Source: Koala Clancy Foundation 2021; Google Satellite 2021¹)

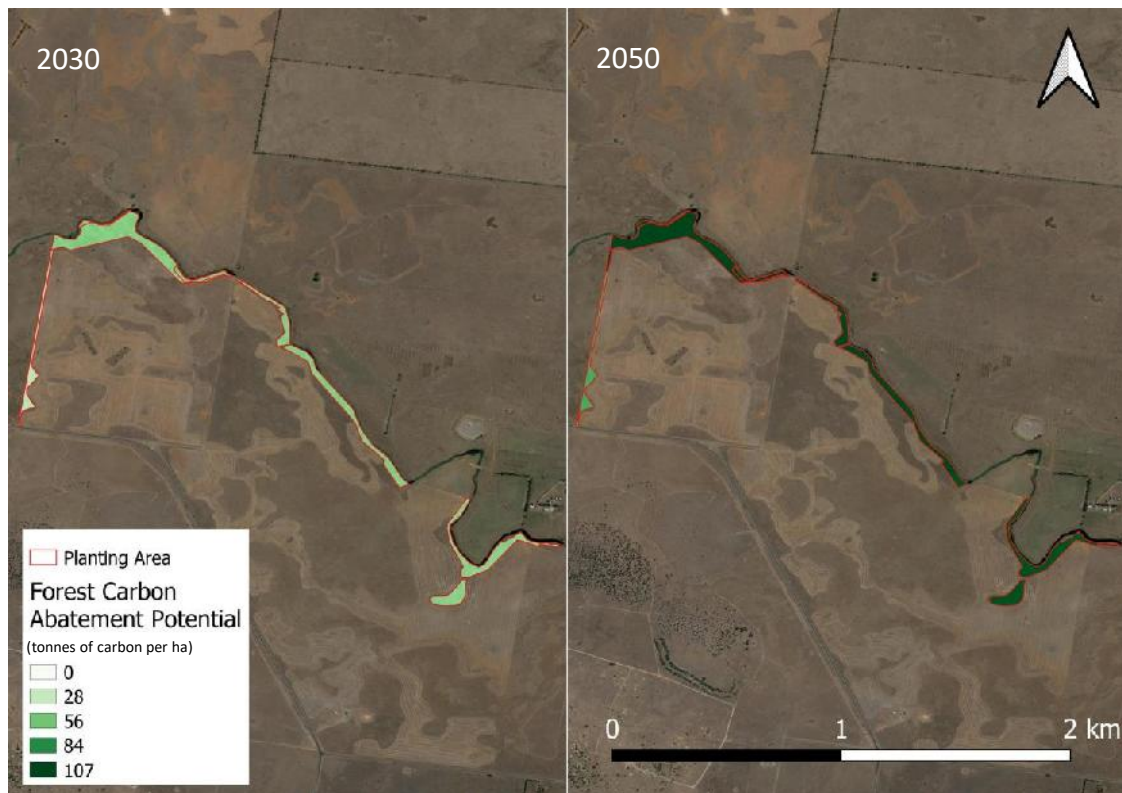


Figure 2 – Map of potential carbon abatement per ha within forest biomass under a Human Induced Regeneration scheme in 2030 (left) and 2050 (right). The forest carbon abatement potential includes Above Ground Biomass (AGB), Below Ground Biomass (BGB), and Dead Organic Matter (DOM). (Source: FLINTpro 2021; Koala Clancy Foundation 2021; Google Satellite 2021¹)

¹ Google Satellite 2021 (via QGIS XYZ tiles: <http://www.google.cn/maps/vt?lyrs=s@189&gl=cn&x={x}&y={y}&z={z}>)

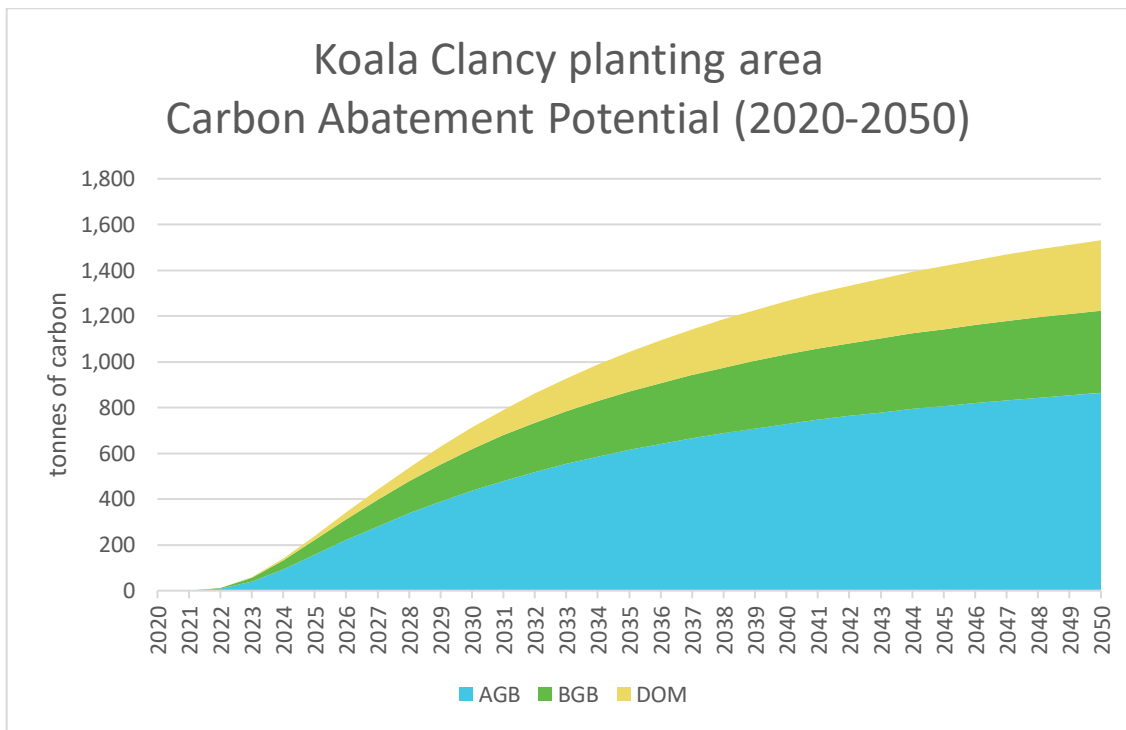


Figure 3 – Carbon abatement potential of the total planted area (~14.9 ha) over the period 2020-2050 (AGB=Above Ground Biomass; BGB=Below Ground Biomass, DOM=Dead Organic Matter).

3. Common Questions

What is a carbon sink and source?

An area of land will be a carbon sink when there is more carbon being sequestered (absorbed) within the land than emissions from it. Inversely, the land will be a source when there is more carbon being emitted than is being sequestered.

How is the forest carbon stock estimated?

FLINTpro uses a model approach that replicates the modelling approach used in Australia’s National Greenhouse Gas Inventory for forest conversion. This approach uses a map of the potential maximum carbon stock that a natural forest could achieve based on a relationship between a forest productivity index (based on temperature, rainfall, frost days, vegetation greenness and soil properties) and measurements of the carbon in mature vegetation at a large number of sites across the continent. Each 250m grid square of Australia has its own estimated potential maximum forest carbon stock. This potential maximum is used in a common growth curve (the Chapman-Richards curve) to calculate the carbon that accumulates in the forest areas as they grow.

4. Data, Assumptions, and Limitations

Data used in the simulations represents a national scale picture, as opposed to precise estimates at the project level. The data has been developed to be accurate, on average, across the region.

Data Required	Default Source	Description
Spatial differentiation of forests	Major Vegetation Groups - environment.gov.au	The Major Vegetation Groups provide a national level grouping of the likely vegetation types across Australia. This is based on data from each of the states and territories and provides an estimate of the pre-1788 vegetation type.
Forest Biomass	www.industry.gov.au/data-and-publications/national-greenhouse-gas-inventory-report-2018	A 250 m long-term average Forest Productivity Index is calculated using yearly average data from 1970–2017. This is used with a relationship (equation) based on ground based measurements of minimally disturbed forests that estimates the likely maximum forest biomass (potential carbon).

Appendix

Table A1 – Carbon abatement potential of the total planted area (total and per ha average), belt area and riparian area (per ha average) over the period 2020-2100 (tC=tonnes of carbon; AGB=Above Ground Biomass; BGB=Below Ground Biomass, DOM=Dead Organic Matter).

Year	Total Planting Area (~14.86ha) Total tC			Total Planting Area (~14.86ha) Average tC ha ⁻¹			Belt Area (~1.47 ha) Average tC ha ⁻¹			Riparian Area (~13.39 ha) Average tC ha ⁻¹		
	AGB	BGB	DOM	AGB	BGB	DOM	AGB	BGB	DOM	AGB	BGB	DOM
2020	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2021	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2022	8.3	3.5	0.3	0.6	0.2	0.0	0.3	0.1	0.0	0.6	0.2	0.0
2023	40.6	16.9	2.3	2.7	1.1	0.2	1.7	0.7	0.1	2.8	1.2	0.2
2024	94.0	39.1	7.7	6.3	2.6	0.5	4.2	1.7	0.3	6.6	2.7	0.5
2025	156.7	65.2	16.8	10.5	4.4	1.1	7.1	3.0	0.7	10.9	4.5	1.2
2026	220.5	91.7	29.1	14.8	6.2	2.0	10.2	4.2	1.3	15.4	6.4	2.0
2027	281.5	117.1	43.7	18.9	7.9	2.9	13.1	5.4	2.0	19.6	8.1	3.0
2028	338.1	140.6	59.8	22.8	9.5	4.0	15.8	6.6	2.8	23.5	9.8	4.2
2029	389.8	162.1	76.7	26.2	10.9	5.2	18.2	7.6	3.6	27.1	11.3	5.3
2030	436.9	181.7	93.8	29.4	12.2	6.3	20.5	8.5	4.4	30.4	12.6	6.5
2031	479.5	199.4	110.8	32.3	13.4	7.5	22.5	9.4	5.2	33.3	13.9	7.7
2032	518.2	215.5	127.3	34.9	14.5	8.6	24.3	10.1	5.9	36.0	15.0	8.9
2033	553.4	230.1	143.2	37.2	15.5	9.6	26.0	10.8	6.7	38.5	16.0	10.0
2034	585.4	243.4	158.4	39.4	16.4	10.7	27.5	11.5	7.4	40.7	16.9	11.0
2035	614.6	255.6	172.8	41.4	17.2	11.6	28.9	12.0	8.1	42.7	17.8	12.0
2036	641.4	266.7	186.4	43.2	17.9	12.5	30.2	12.6	8.8	44.6	18.5	13.0
2037	666.0	277.0	199.2	44.8	18.6	13.4	31.4	13.1	9.4	46.3	19.3	13.8
2038	688.6	286.4	211.2	46.3	19.3	14.2	32.5	13.5	9.9	47.9	19.9	14.7
2039	709.5	295.1	222.5	47.7	19.9	15.0	33.5	13.9	10.5	49.3	20.5	15.5
2040	728.9	303.1	233.0	49.0	20.4	15.7	34.4	14.3	11.0	50.7	21.1	16.2
2041	746.8	310.6	242.9	50.3	20.9	16.3	35.2	14.7	11.4	51.9	21.6	16.9
2042	763.5	317.5	252.2	51.4	21.4	17.0	36.0	15.0	11.9	53.1	22.1	17.5
2043	779.1	324.0	260.9	52.4	21.8	17.6	36.8	15.3	12.3	54.1	22.5	18.1
2044	793.7	330.1	269.0	53.4	22.2	18.1	37.5	15.6	12.7	55.2	22.9	18.7
2045	807.3	335.7	276.6	54.3	22.6	18.6	38.1	15.8	13.0	56.1	23.3	19.2
2046	820.1	341.0	283.7	55.2	23.0	19.1	38.7	16.1	13.4	57.0	23.7	19.7
2047	832.1	346.0	290.4	56.0	23.3	19.5	39.3	16.3	13.7	57.8	24.0	20.2
2048	843.4	350.7	296.7	56.8	23.6	20.0	39.8	16.6	14.0	58.6	24.4	20.6
2049	854.1	355.2	302.6	57.5	23.9	20.4	40.3	16.8	14.3	59.4	24.7	21.0
2050	864.2	359.4	308.1	58.2	24.2	20.7	40.8	17.0	14.5	60.1	25.0	21.4
2051	873.7	363.4	313.4	58.8	24.5	21.1	41.3	17.2	14.8	60.7	25.3	21.8
2052	882.8	367.1	318.3	59.4	24.7	21.4	41.7	17.3	15.0	61.4	25.5	22.1
2053	891.4	370.7	322.9	60.0	24.9	21.7	42.1	17.5	15.2	61.9	25.8	22.4
2054	899.5	374.1	327.3	60.5	25.2	22.0	42.5	17.7	15.5	62.5	26.0	22.7
2055	907.3	377.3	331.5	61.1	25.4	22.3	42.9	17.8	15.7	63.1	26.2	23.0
2056	914.6	380.4	335.4	61.6	25.6	22.6	43.2	18.0	15.8	63.6	26.4	23.3
2057	921.7	383.3	339.1	62.0	25.8	22.8	43.5	18.1	16.0	64.1	26.6	23.6
2058	928.4	386.1	342.7	62.5	26.0	23.1	43.9	18.2	16.2	64.5	26.8	23.8

Year	Total Planting Area (~14.86ha)			Total Planting Area (~14.86ha)			Belt Area (~1.47 ha)			Riparian Area (~13.39 ha)		
	Total tC			Average tC ha ⁻¹			Average tC ha ⁻¹			Average tC ha ⁻¹		
	AGB	BGB	DOM	AGB	BGB	DOM	AGB	BGB	DOM	AGB	BGB	DOM
2059	934.8	388.8	346.0	62.9	26.2	23.3	44.2	18.4	16.3	65.0	27.0	24.0
2060	941.0	391.3	349.2	63.3	26.3	23.5	44.5	18.5	16.5	65.4	27.2	24.3
2061	946.8	393.7	352.2	63.7	26.5	23.7	44.7	18.6	16.6	65.8	27.4	24.5
2062	952.5	396.1	355.1	64.1	26.7	23.9	45.0	18.7	16.8	66.2	27.5	24.7
2063	957.9	398.3	357.8	64.5	26.8	24.1	45.3	18.8	16.9	66.6	27.7	24.9
2064	963.0	400.5	360.4	64.8	27.0	24.3	45.5	18.9	17.0	66.9	27.8	25.0
2065	968.0	402.6	363.0	65.1	27.1	24.4	45.7	19.0	17.1	67.3	28.0	25.2
2066	972.8	404.6	365.3	65.5	27.2	24.6	46.0	19.1	17.3	67.6	28.1	25.4
2067	977.4	406.5	367.6	65.8	27.4	24.7	46.2	19.2	17.4	67.9	28.2	25.5
2068	981.8	408.3	369.8	66.1	27.5	24.9	46.4	19.3	17.5	68.2	28.4	25.7
2069	986.1	410.1	371.9	66.4	27.6	25.0	46.6	19.4	17.6	68.5	28.5	25.8
2070	990.2	411.8	373.9	66.6	27.7	25.2	46.8	19.5	17.7	68.8	28.6	26.0
2071	994.2	413.4	375.8	66.9	27.8	25.3	47.0	19.5	17.8	69.1	28.7	26.1
2072	998.0	415.0	377.7	67.2	27.9	25.4	47.2	19.6	17.8	69.4	28.8	26.2
2074	1005.3	418.1	381.2	67.7	28.1	25.7	47.5	19.8	18.0	69.9	29.1	26.5
2077	1015.4	422.3	386.0	68.3	28.4	26.0	48.0	20.0	18.2	70.6	29.3	26.8
2078	1018.5	423.6	387.4	68.5	28.5	26.1	48.1	20.0	18.3	70.8	29.4	26.9
2079	1021.5	424.8	388.9	68.7	28.6	26.2	48.3	20.1	18.4	71.0	29.5	27.0
2080	1024.5	426.0	390.2	68.9	28.7	26.3	48.4	20.1	18.4	71.2	29.6	27.1
2081	1027.4	427.2	391.6	69.1	28.8	26.3	48.6	20.2	18.5	71.4	29.7	27.2
2082	1030.1	428.4	392.8	69.3	28.8	26.4	48.7	20.2	18.6	71.6	29.8	27.3
2083	1032.8	429.5	394.1	69.5	28.9	26.5	48.8	20.3	18.6	71.8	29.8	27.4
2084	1035.4	430.6	395.3	69.7	29.0	26.6	48.9	20.4	18.7	72.0	29.9	27.5
2086	1040.5	432.7	397.6	70.0	29.1	26.8	49.2	20.5	18.8	72.3	30.1	27.6
2087	1042.9	433.7	398.7	70.2	29.2	26.8	49.3	20.5	18.8	72.5	30.1	27.7
2088	1045.2	434.7	399.7	70.3	29.3	26.9	49.4	20.5	18.9	72.6	30.2	27.8
2089	1047.5	435.6	400.8	70.5	29.3	27.0	49.5	20.6	18.9	72.8	30.3	27.9
2090	1049.7	436.5	401.8	70.6	29.4	27.0	49.6	20.6	19.0	72.9	30.3	27.9
2091	1051.9	437.4	402.7	70.8	29.4	27.1	49.7	20.7	19.0	73.1	30.4	28.0
2092	1054.0	438.3	403.7	70.9	29.5	27.2	49.8	20.7	19.1	73.2	30.5	28.1
2093	1056.0	439.1	404.6	71.1	29.6	27.2	49.9	20.8	19.1	73.4	30.5	28.1
2094	1058.0	440.0	405.5	71.2	29.6	27.3	50.0	20.8	19.2	73.5	30.6	28.2
2095	1059.9	440.8	406.4	71.3	29.7	27.3	50.1	20.8	19.2	73.7	30.6	28.2
2096	1061.8	441.6	407.2	71.5	29.7	27.4	50.2	20.9	19.2	73.8	30.7	28.3
2097	1063.7	442.3	408.0	71.6	29.8	27.5	50.3	20.9	19.3	73.9	30.7	28.4
2098	1065.5	443.1	408.8	71.7	29.8	27.5	50.4	20.9	19.3	74.0	30.8	28.4
2099	1067.3	443.8	409.6	71.8	29.9	27.6	50.5	21.0	19.4	74.2	30.8	28.5
2100	1069.0	444.6	410.4	71.9	29.9	27.6	50.5	21.0	19.4	74.3	30.9	28.5