Carbon Positive Australia

214 Nimbin, NSW

Year 3 Monitoring Report

Prepared by Carbon Positive Australia

November 2024

Contents

Site Overview

Site Name	‘Nimbin, NSW’
Site ID (CPOZ)	214
Site Manager	Sam Davies (Future Forests)
Planting Area	27.5 hectares
Planting Details	69,070 seedlings hand-planted in March & May 2022, additional 1,200 seedlings planted to infill areas in 2023, additional 450 seedlings planted to infill creek line in 2024.
Species Planted	104 native species (refer to Appendix)
Future Planting	The site will be monitored again in 2025 to measure progress and assess need for further infill planting.

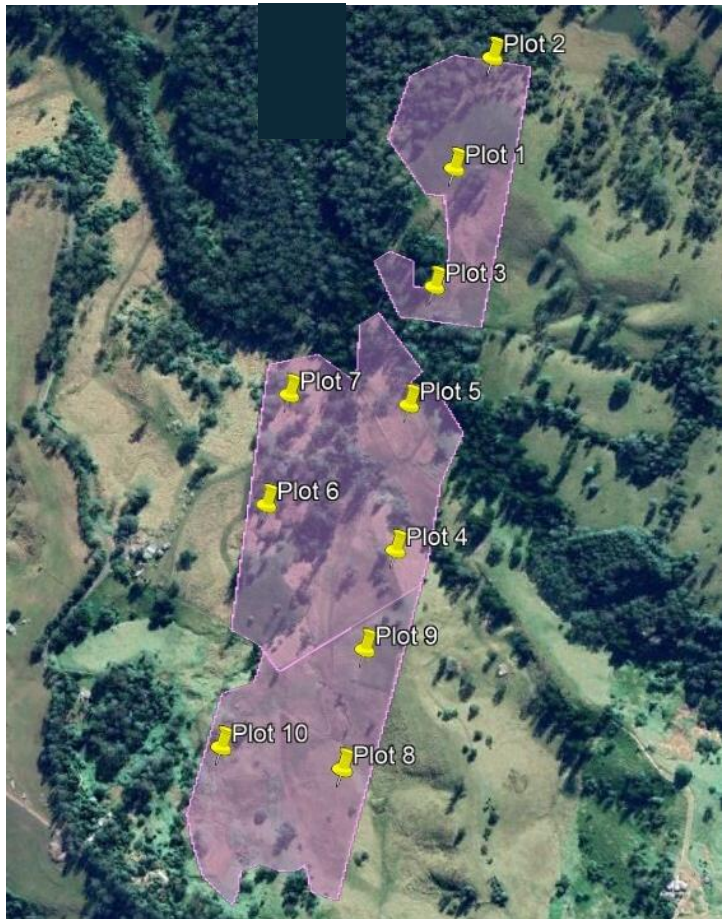
Project Background

Located in a medium to high-value koala habitat, this northern NSW property was previously used to graze Dexter cattle and has been extensively cleared. Carbon Positive Australia and Future Forests are working together to restore approximately 33 hectares of the property with native dry rainforest, sclerophyll and riparian species. This ecological restoration project will provide a wildlife corridor, linking up remnant bushland between two national parks. The aim is to restore the site to a thriving forest; increasing habitat for a range of endangered species (including koalas), improving biodiversity, and encouraging further natural regeneration.

In 2021, the Future Forests team began work on the 6 hectares allocated to bush regeneration. This process included removing invasive species such as camphor laurel and privet. In 2022, the team planted a diverse mix of approximately 69,000 native species across the remaining 27.5 hectares during a very high rainfall year. The species mix was highly diverse with a total of 104 species planted. An additional 1,200 seedlings were planted in 2023 to infill patchy areas and in 2024, 450 seedlings were planted to the infill creek line.

Bush regeneration, site maintenance and monitoring will continue over the coming years.

Monitoring Overview



Type	Year 3 Monitoring Assessment
Date	20th – 21st November 2024
Monitored by	Sam Davies (Future Forests) and Jason Rawnsley (Wanganui Green)
Number of plots	10
Plot type	Circular
Plot size	0.05 ha (500m^2)
Total monitoring area	0.5 ha (5,000m^2)
Metrics assessed	• Genera • Height (m) • Health[1] (0-5 rating) • Pest damage[2] (0-5 rating) • DBH[3] (mm)

1. Health rated from 0 to 5, where 0 equals dead (i.e. no green leaves), 1 equals 0-5% health, 2 equals 5-25% health, 3 equals 25-50% health, 4 equals 50-75% health, and 5 equals 75-100% health.
2. Pest damage rated from 0 to 5, where 0 equals no damage, 1 equals 0-5% pest damage, 2 equals 5-25% pest damage, 3 equals 25-50% pest damage, 4 equals 50-75% pest damage, and 5 equals 75-100% pest damage.
3. Diameter at breast height (where breast height equals 1.3m).

Site Level Results

Overview

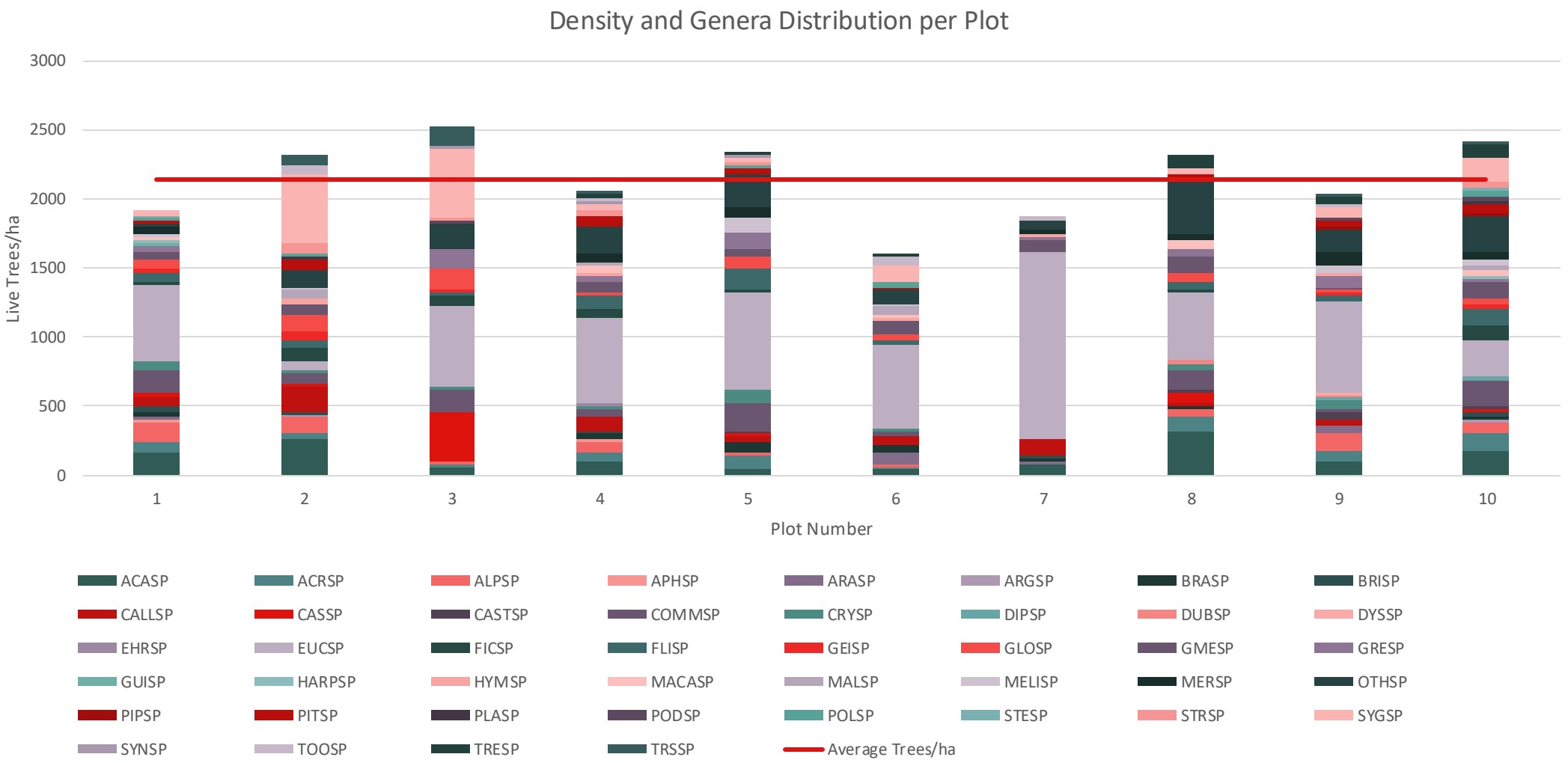
Metric	2023 Assessment	2024 Assessment
Average density (live trees/ha)	2,558	2,142
Average survival	97%[1]	84%[1]
Average health	4.47	5.00
Average pest damage	0.25	0.01
Average height (m)	1.14	2.21
Max height (m)	4.40	5.03
Average DBH (mm)	3.49	20.81

General observations:

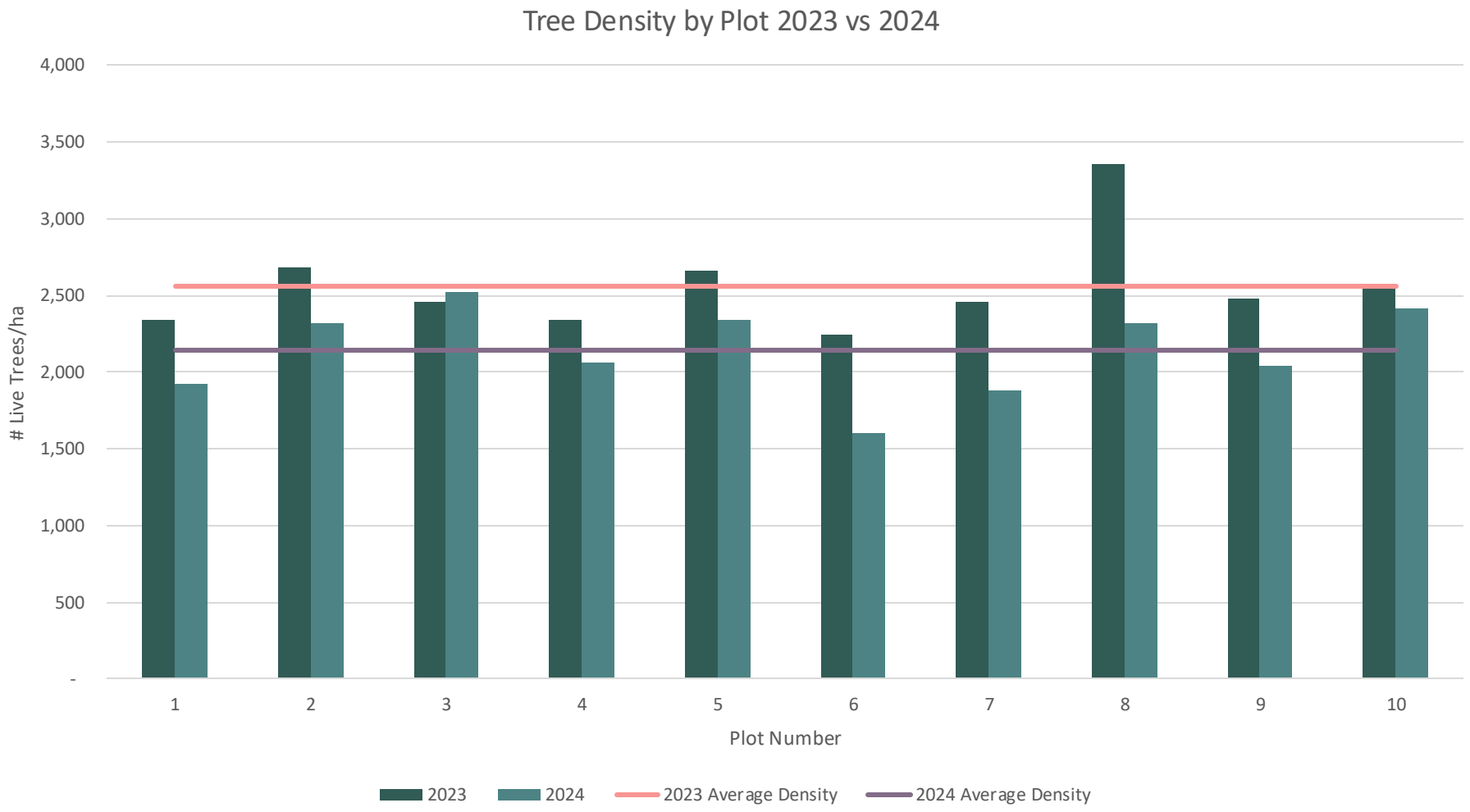
- Overall, the average survival rate was 84%. A reduction is to be expected as trees start to compete for resources.
- Trees across all plots showed great signs of health, only Plot 2 received a rating below 5 (4.98).
- The overall average height increased by 94%, from 1.14m to 2.21m.
- The average tree density declined by 16%, from 2,558 trees/ha to 2,142 trees/ha (including both planted seedlings and natural regeneration).
- Tree density was relatively consistent across the plots (between 1,600 and 2,520 trees/ha) despite variable topography, soil and weed cover.
- Pest damage was minimal across all plots, with a 95% decrease from the 2023 assessment.
- Excellent genera diversity was exhibited across all plots (between 12-33 different genera per plot with an average of 24 per plot).

1. Average survival calculated based on initial average planting density, adjusted for natural regeneration.
2. Prior assessment was undertaken in October 2023.

Genera Density and Diversity



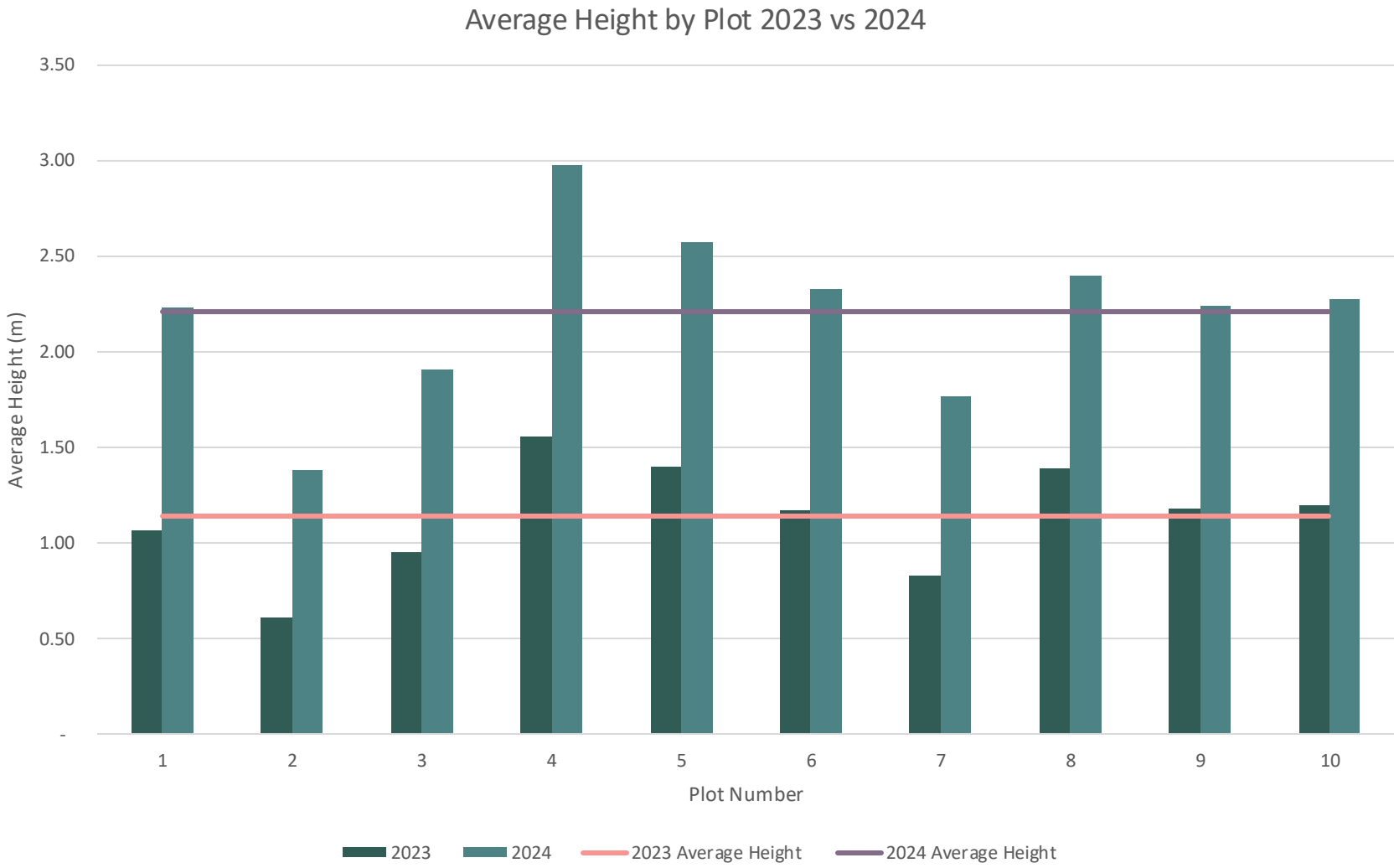
Tree Density – Year on Year



Plot Number	% Change
1	-18%
2	-13%
3	2%
4	-12%
5	-12%
6	-29%
7	-24%
8	-31%
9	-18%
10	-5%
Average	**-16%**

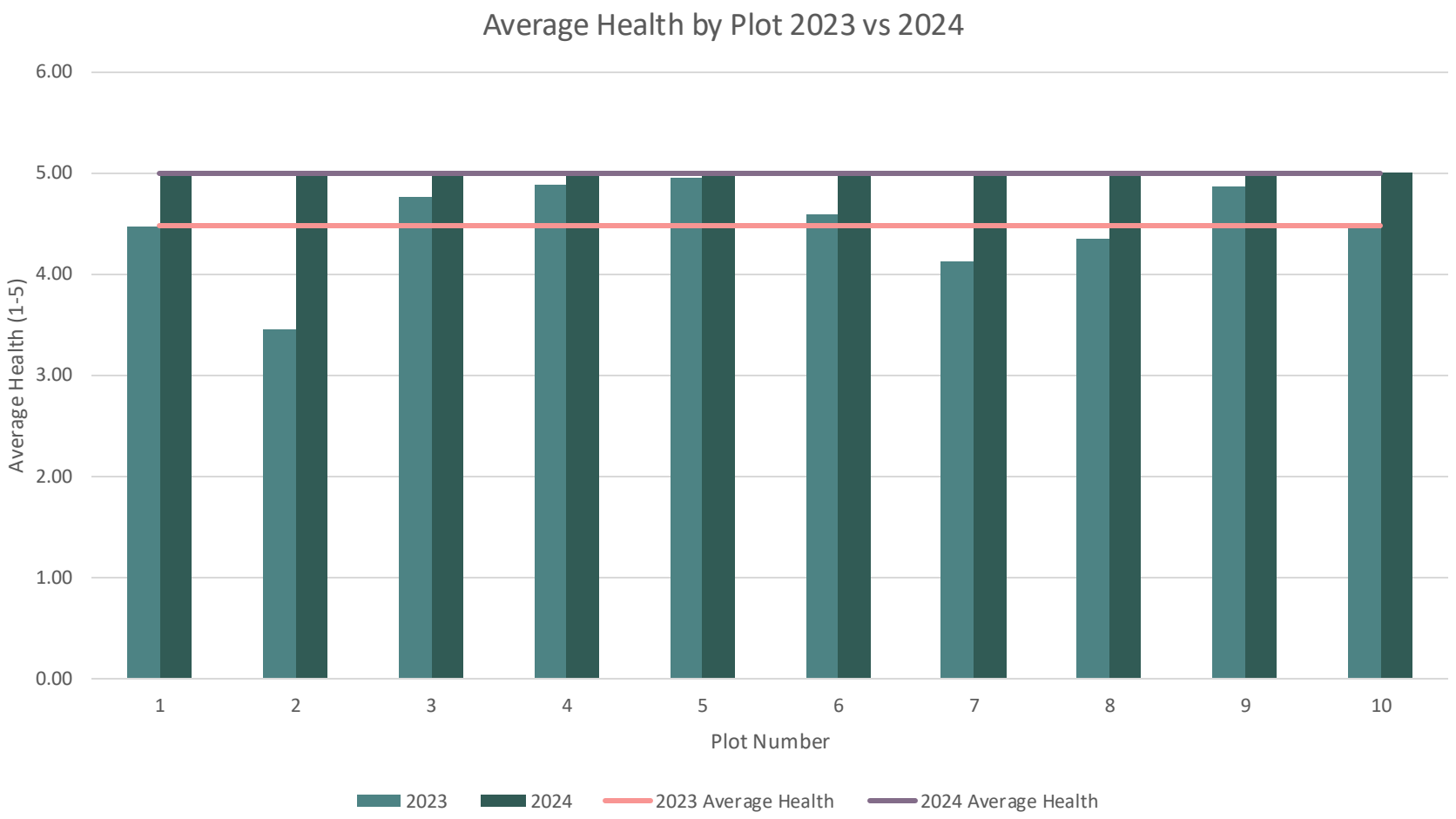
1. Survival rate is calculated based on the sitewide average planting density.

Tree Height – Year on Year



Plot Number	% Change
1	110%
2	126%
3	100%
4	91%
5	84%
6	98%
7	113%
8	72%
9	91%
10	90%
Average	**94%**

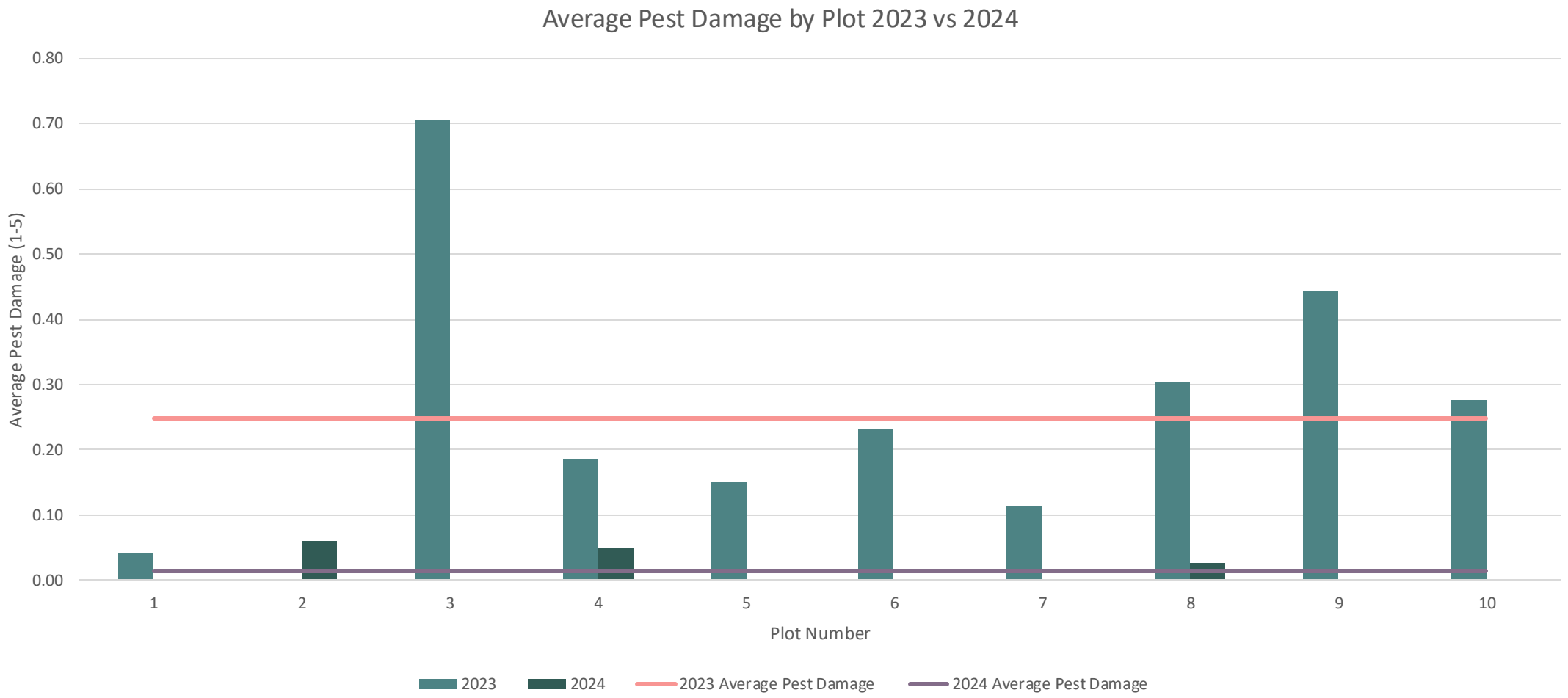
Tree Health – Year on Year



Plot Number	% Change
1	12%
2	44%
3	5%
4	3%
5	1%
6	9%
7	21%
8	15%
9	3%
10	13%
Average	**12%**

1. Health rated from 0 to 5, where 0 equals dead (i.e. no green leaves), 1 equals 0-5% health, 2 equals 5-25% health, 3 equals 25-50% health, 4 equals 50-75% health, and 5 equals 75-100% health.

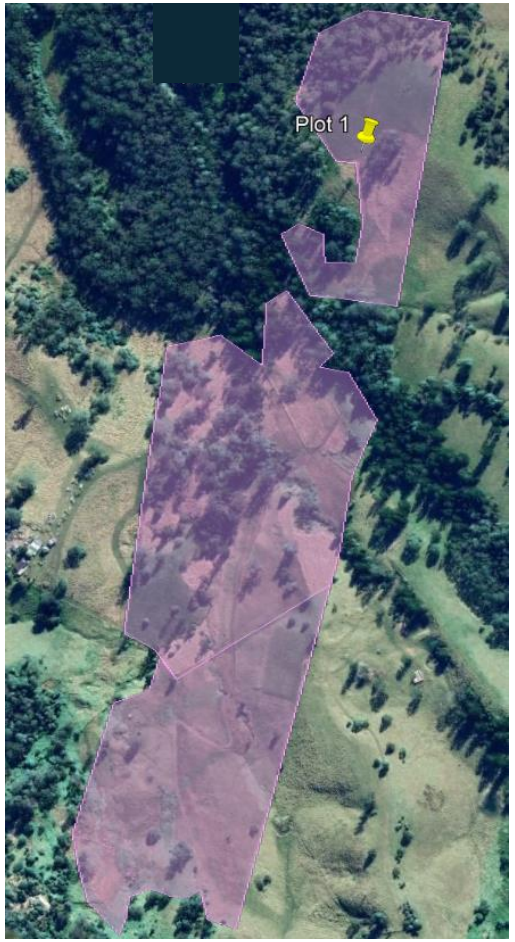
Tree Damage – Year on Year



1. Pest damage rated from 0 to 5, where 0 equals no damage, 1 equals 0-5% pest damage, 2 equals 5-25% pest damage, 3 equals 25-50% pest damage, 4 equals 50-75% pest damage, and 5 equals 75-100% pest damage.

Plot Level Results

Plot 1



Plot size	0.05 hectares (500m^2)
Tree count (total)	98
Tree count (live)	96
Survival[1]	75%
Tree density (live trees/ha)	1,920
Genera present	28
Average height (live trees only)	2.23 m
Max height (live trees only)	5.00 m
Average Health[2]	5.00
Average Pest Damage[3]	0.00
Average DBH	19.65 mm

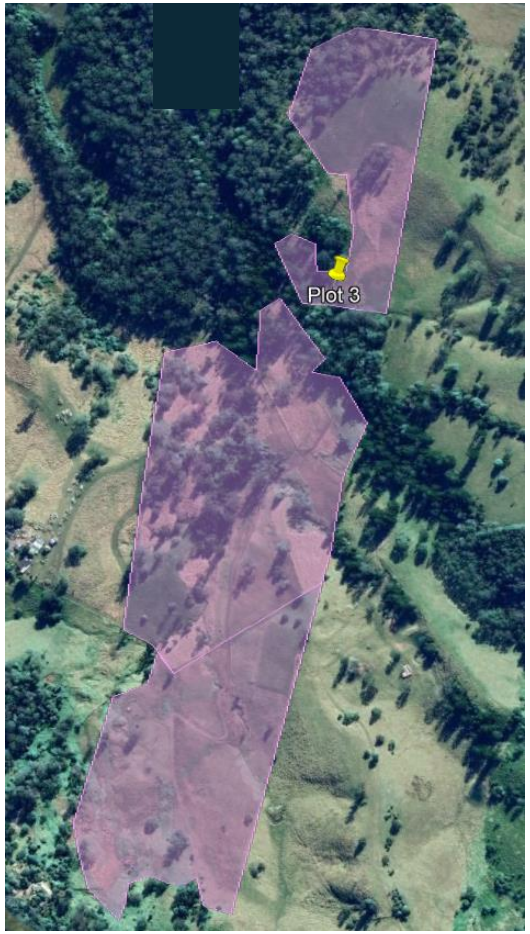
1. Average survival calculated based on initial average planting density, adjusted for natural regeneration.
2. Health rated from 0 to 5, where 0 equals dead (i.e. no green leaves), 1 equals 0-5% health, 2 equals 5-25% health, 3 equals 25-50% health, 4 equals 50-75% health, and 5 equals 75-100% health.
3. Pest damage rated from 0 to 5, where 0 equals no damage, 1 equals 0-5% pest damage, 2 equals 5-25% pest damage, 3 equals 25-50% pest damage, 4 equals 50-75% pest damage, and 5 equals 75-100% pest damage.

Plot 2

Plot size	0.05 hectares (500m^2)
Tree count (total)	118
Tree count (live)	116
Survival[1]	91%
Tree density (live trees/ha)	2,320
Genera present	26
Average height (live trees only)	1.38 m
Max height (live trees only)	4.60 m
Average Health[2]	4.97
Average Pest Damage[3]	0.06
Average DBH	4.98 mm

1. Average survival calculated based on initial average planting density, adjusted for natural regeneration.
2. Health rated from 0 to 5, where 0 equals dead (i.e. no green leaves), 1 equals 0-5% health, 2 equals 5-25% health, 3 equals 25-50% health, 4 equals 50-75% health, and 5 equals 75-100% health.
3. Pest damage rated from 0 to 5, where 0 equals no damage, 1 equals 0-5% pest damage, 2 equals 5-25% pest damage, 3 equals 25-50% pest damage, 4 equals 50-75% pest damage, and 5 equals 75-100% pest damage.

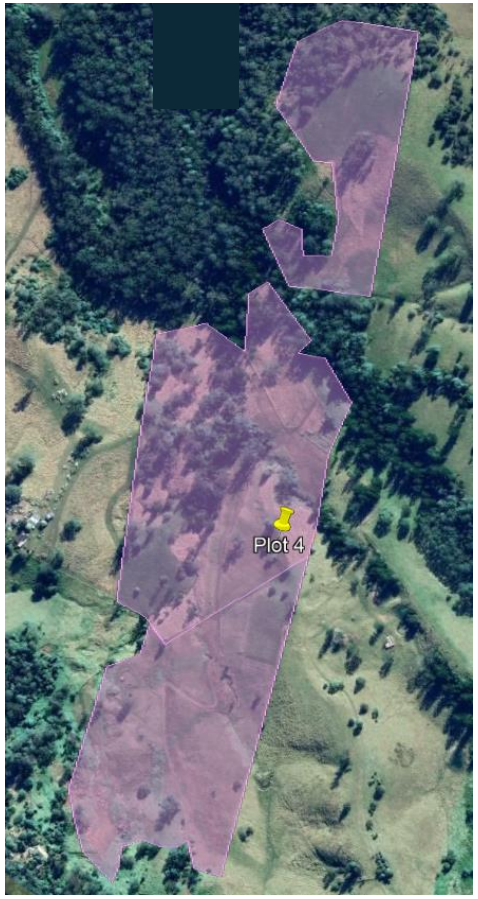
Plot 3



Plot size	0.05 hectares (500m^2)
Tree count (total)	126
Tree count (live)	126
Survival[1]	99%
Tree density (live trees/ha)	2,520
Genera present	18
Average height (live trees only)	1.91 m
Max height (live trees only)	7.00 m
Average Health[2]	5.00
Average Pest Damage[3]	0.00
Average DBH	11.17 mm

1. Average survival calculated based on initial average planting density, adjusted for natural regeneration.
2. Health rated from 0 to 5, where 0 equals dead (i.e. no green leaves), 1 equals 0-5% health, 2 equals 5-25% health, 3 equals 25-50% health, 4 equals 50-75% health, and 5 equals 75-100% health.
3. Pest damage rated from 0 to 5, where 0 equals no damage, 1 equals 0-5% pest damage, 2 equals 5-25% pest damage, 3 equals 25-50% pest damage, 4 equals 50-75% pest damage, and 5 equals 75-100% pest damage.

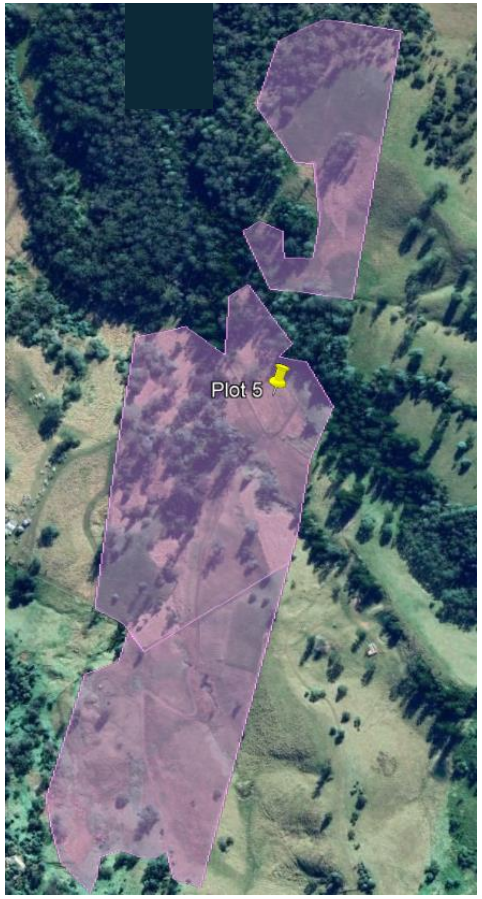
Plot 4



Plot size	0.05 hectares (500m^2)
Tree count (total)	103
Tree count (live)	103
Survival[1]	81%
Tree density (live trees/ha)	2,060
Genera present	28
Average height (live trees only)	2.98 m
Max height (live trees only)	5.80 m
Average Health[2]	5.00
Average Pest Damage[3]	0.05
Average DBH	37.36 mm

1. Average survival calculated based on initial average planting density, adjusted for natural regeneration.
2. Health rated from 0 to 5, where 0 equals dead (i.e. no green leaves), 1 equals 0-5% health, 2 equals 5-25% health, 3 equals 25-50% health, 4 equals 50-75% health, and 5 equals 75-100% health.
3. Pest damage rated from 0 to 5, where 0 equals no damage, 1 equals 0-5% pest damage, 2 equals 5-25% pest damage, 3 equals 25-50% pest damage, 4 equals 50-75% pest damage, and 5 equals 75-100% pest damage.

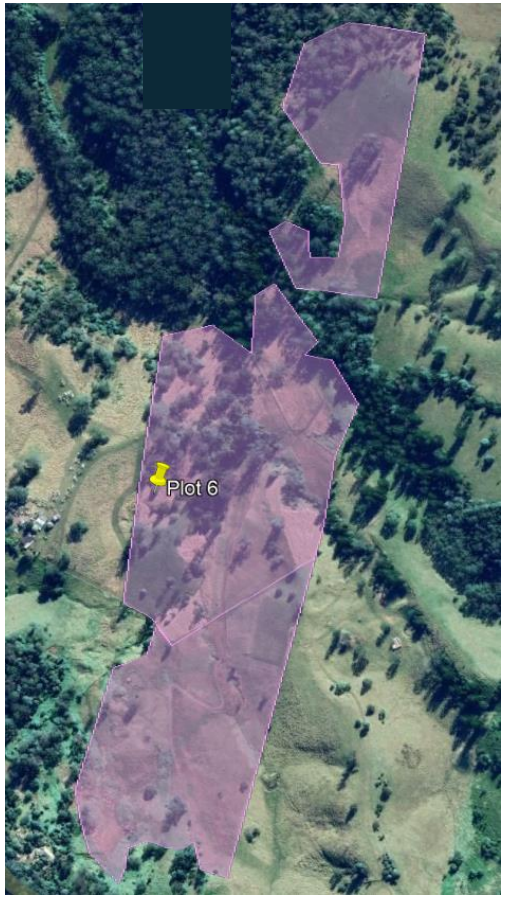
Plot 5



Plot size	0.05 hectares (500m^2)
Tree count (total)	117
Tree count (live)	117
Survival[1]	92%
Tree density (live trees/ha)	2,340
Genera present	24
Average height (live trees only)	2.57 m
Max height (live trees only)	5.30 m
Average Health[2]	5.00
Average Pest Damage[3]	0.00
Average DBH	32.12 mm

1. Average survival calculated based on initial average planting density, adjusted for natural regeneration.
2. Health rated from 0 to 5, where 0 equals dead (i.e. no green leaves), 1 equals 0-5% health, 2 equals 5-25% health, 3 equals 25-50% health, 4 equals 50-75% health, and 5 equals 75-100% health.
3. Pest damage rated from 0 to 5, where 0 equals no damage, 1 equals 0-5% pest damage, 2 equals 5-25% pest damage, 3 equals 25-50% pest damage, 4 equals 50-75% pest damage, and 5 equals 75-100% pest damage.

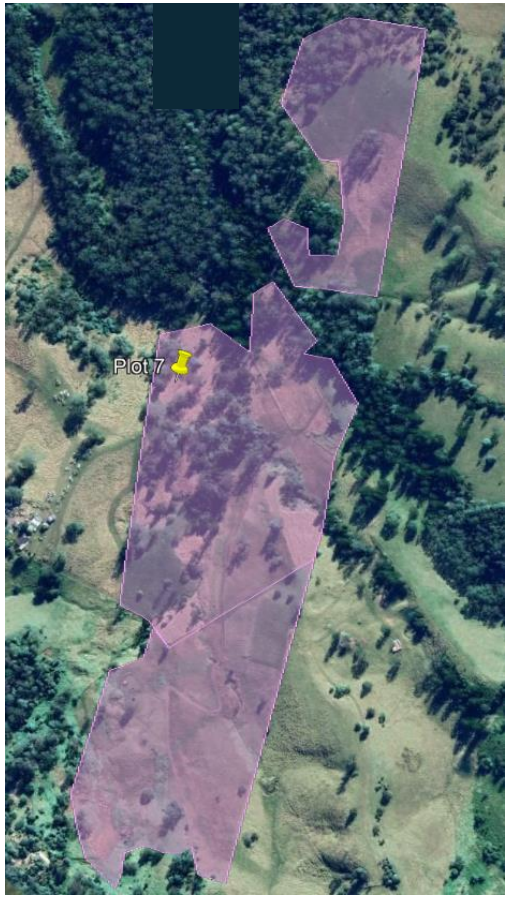
Plot 6



Plot size	0.05 hectares (500m^2)
Tree count (total)	80
Tree count (live)	80
Survival[1]	63%
Tree density (live trees/ha)	1,600
Genera present	22
Average height (live trees only)	2.33 m
Max height (live trees only)	4.20 m
Average Health[2]	5.00
Average Pest Damage[3]	0.00
Average DBH	24.71 mm

1. Average survival calculated based on initial average planting density, adjusted for natural regeneration.
2. Health rated from 0 to 5, where 0 equals dead (i.e. no green leaves), 1 equals 0-5% health, 2 equals 5-25% health, 3 equals 25-50% health, 4 equals 50-75% health, and 5 equals 75-100% health.
3. Pest damage rated from 0 to 5, where 0 equals no damage, 1 equals 0-5% pest damage, 2 equals 5-25% pest damage, 3 equals 25-50% pest damage, 4 equals 50-75% pest damage, and 5 equals 75-100% pest damage.

Plot 7



Plot size	0.05 hectares (500m^2)
Tree count (total)	94
Tree count (live)	94
Survival[1]	74%
Tree density (live trees/ha)	1,880
Genera present	12
Average height (live trees only)	1.76 m
Max height (live trees only)	3.20 m
Average Health[2]	5.00
Average Pest Damage[3]	0.00
Average DBH	10.96 mm

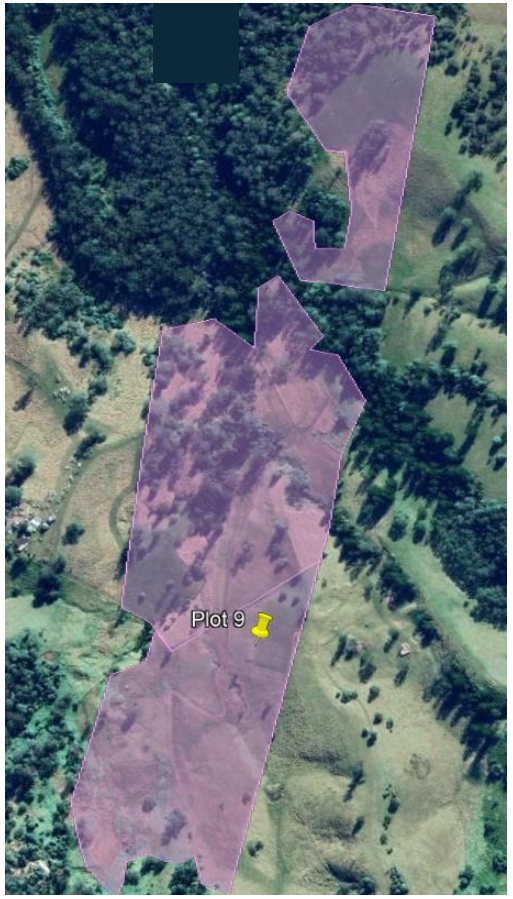
1. Average survival calculated based on initial average planting density, adjusted for natural regeneration.
2. Health rated from 0 to 5, where 0 equals dead (i.e. no green leaves), 1 equals 0-5% health, 2 equals 5-25% health, 3 equals 25-50% health, 4 equals 50-75% health, and 5 equals 75-100% health.
3. Pest damage rated from 0 to 5, where 0 equals no damage, 1 equals 0-5% pest damage, 2 equals 5-25% pest damage, 3 equals 25-50% pest damage, 4 equals 50-75% pest damage, and 5 equals 75-100% pest damage.

Plot 8

Plot size	0.05 hectares (500m^2)
Tree count (total)	116
Tree count (live)	116
Survival[1]	91%
Tree density (live trees/ha)	2,320
Genera present	22
Average height (live trees only)	2.39 m
Max height (live trees only)	5.40 m
Average Health[2]	5.00
Average Pest Damage[3]	0.03
Average DBH	24.28 mm

1. Average survival calculated based on initial average planting density, adjusted for natural regeneration.
2. Health rated from 0 to 5, where 0 equals dead (i.e. no green leaves), 1 equals 0-5% health, 2 equals 5-25% health, 3 equals 25-50% health, 4 equals 50-75% health, and 5 equals 75-100% health.
3. Pest damage rated from 0 to 5, where 0 equals no damage, 1 equals 0-5% pest damage, 2 equals 5-25% pest damage, 3 equals 25-50% pest damage, 4 equals 50-75% pest damage, and 5 equals 75-100% pest damage.

Plot 9



Plot size	0.05 hectares (500m^2)
Tree count (total)	102
Tree count (live)	102
Survival[1]	80%
Tree density (live trees/ha)	2,040
Genera present	28
Average height (live trees only)	2.24 m
Max height (live trees only)	4.20 m
Average Health[2]	5.00
Average Pest Damage[3]	0.00
Average DBH	22.75 mm

1. Average survival calculated based on initial average planting density, adjusted for natural regeneration.
2. Health rated from 0 to 5, where 0 equals dead (i.e. no green leaves), 1 equals 0-5% health, 2 equals 5-25% health, 3 equals 25-50% health, 4 equals 50-75% health, and 5 equals 75-100% health.
3. Pest damage rated from 0 to 5, where 0 equals no damage, 1 equals 0-5% pest damage, 2 equals 5-25% pest damage, 3 equals 25-50% pest damage, 4 equals 50-75% pest damage, and 5 equals 75-100% pest damage.

Plot 10

Plot size	0.05 hectares (500m^2)
Tree count (total)	121
Tree count (live)	121
Survival[1]	95%
Tree density (live trees/ha)	2,420
Genera present	33
Average height (live trees only)	2.27 m
Max height (live trees only)	5.60 m
Average Health[2]	5.00
Average Pest Damage[3]	0.00
Average DBH	20.12 mm

1. Average survival calculated based on initial average planting density, adjusted for natural regeneration.
2. Health rated from 0 to 5, where 0 equals dead (i.e. no green leaves), 1 equals 0-5% health, 2 equals 5-25% health, 3 equals 25-50% health, 4 equals 50-75% health, and 5 equals 75-100% health.
3. Pest damage rated from 0 to 5, where 0 equals no damage, 1 equals 0-5% pest damage, 2 equals 5-25% pest damage, 3 equals 25-50% pest damage, 4 equals 50-75% pest damage, and 5 equals 75-100% pest damage.

Next Steps

Next Steps

2025 and Beyond

- Comprehensive monitoring assessments to be conducted annually during the six years after initial planting (i.e. until 2027).
- Infill planting as and when required.
- Pest management as and when required.

Appendices

Appendix 1 – Genus Codes

Code	Genus
ACASP	*Acacia*
ACMSP	*Acmena*
ACRSP	*Acronychia*
ALCSP	*Alchornea*
ALESP	*Alectryon*
ALPSP	*Alphitonia*
ANGSP	*Angophora*
APHSP	*Aphananthe*
ARASP	*Araucaria*
ARGSP	*Argyrodendron*
ARYSP	*Arytera*
AUSSP	*Austroboxus*
BRASP	*Brachychiton*
BRISP	*Bridelia*
CALLSP	*Callistemon*
CASSP	*Casuarina*
CASTSP	*Castanospermum*
CERSP	*Ceratapetalum*
CINSP	*Cinnamonum*
COMMSP	*Commersonia*

Code	Genus
CORSP	*Corymbia*
CRYSP	*Cryptocarya*
DAPSP	*Daphnandra*
DENSP	*Denhamia*
DIPSP	*Diploglottis*
DNDSP	*Dendroxinide*
DRYSP	*Drypetes*
DUBSP	*Dubosia*
DYSSP	*Dysoxylum*
EHRSP	*Ehretia*
ENDSP	*Endiandra*
ERYSP	*Erythrina*
EUCSP	*Eucalyptus*
EURSP	*Euroschinus*
FICSP	*Ficus*
FLISP	*Flindersia*
GEISP	*Geiossios*
GLOSP	*Glochidion*
GMESP	*Gmelina*
GRESP	*Grevillea*

Code	Genus
GUISP	*Guioa*
HARPSP	*Harpullia*
HYMSP	*Hymenosporum*
JAGSP	*Jagara*
LAPSP	*Laphostomen*
MACASP	*Macaranga*
MALSP	*Mallotus*
MCDSP	*Macadamia*
MELISP	*Melia*
MERSP	*Mersine*
NOTSP	*Noteleaea*
OLESP	*Olea*
OTHSP	*Other*
PENSP	*Pentaceras*
PIPSP	*Pipturus*
PITSP	*Pittosporum*
PLASP	*Planchenella*
PODSP	*Podocarpus*
POLSP	*Polyscias*
SARSP	*Sarcopterix*

Code	Genus
SLOSP	*Sloanea*
STESP	*Stenocarpus*
STRSP	*Streblus*
SYCSP	*Syncarpia*
SYGSP	*Sygyzium*
SYNSP	*Synoum*
TOESP	*Toechima*
TOOSP	*Toona*
TRESP	*Trema*
TRSSP	*Tristaniopsis*

Appendix 2 – Species List (2022 Planting)

Species	Seedling quantity
Commersonia bartramia	3,000
Eucalyptus teretacornis	2,900
Polyscias elegans	2,500
Araucaria cunninghamii	2,500
Gmelina leichhardtii	2,500
Grevillea robusta	2,400
Macaranga tanarius	1,900
Alphitonia excelsa	1,900
Acacia melonoxylon	1,900
Acronychia oblonifolia	1,900
Casuarina cunninhamiana	1,900
Flindersia schottiana	1,900
Acmena smithii	1,900
Trema tormentosa	1,700
Glochidion ferdinandi	1,700

Species	Seedling quantity
Aphananthe philippensis	1,700
Corymbia intermedia	1,600
Dubosia myoporoides	700
Acacia disparrima	700
Cryptocarya glaucescens	700
Mallotus philippensis	700
Mersine howittiana	700
Pentaceras austral	700
Brachychiton acerifolius	700
Brachychiton discolor	700
Cryptocarya obovate	700
Ehretia acuminata	700
Harpullia pendula	700
Noteleaea longifloia	700
Olea paniculate	700

Appendix 2 (cont.)

Species	Seedling quantity
Sloanea australis	700
Laphostomen confertus	700
Callistemon viminalis	700
Angophora subveletina	700
Pipturus argenteus	600
Pittosporum undulatum	600
Diploglottis australis	600
Geissios bethamii	600
Argyrodendron trifoliatum	600
Sarcopterix stipata	600
Streblus brunonianus	600
Euroschinus falcatus	600
Flindersia bennettii	600
Cryptocarya rigida	600
Daphnandra apetala	600

Species	Seedling quantity
Ficus coronata	600
Eucalyptus grandis	600
Corymbia gummifera	600
Commersonia populneus	600
Eucalyptus siderafora	550
Brachychiton populneus	450
Melia azedarach	400
Alchornea ilicifolia	250
Bridelia exaltata	250
Denhamia celastroides	250
Erythrina vespirilio	250
Flindersia xanthoxyla	250
Guioa semiglauca	250
Harpullia hillii	250
Hymenosporum flavum	250

Appendix 2 (cont.)

Species	Seedling quantity
Jagara pseudorhus	250
Mallotus claxyloides	250
Synoum glandulosum	250
Toechima dasyrrhache	250
Acemna ingens	250
Argydendron grandiflorum	250
Argydendron hendersonii	250
Arytera distylis	250
Austroboxus swanii	250
Castanospermum australe	250
Ceratapetalum apetalum	250
Cinnamonum oliveri	250
Cryptocarya micronueura	250
Cryptocarya trplinervis	250
Drypetes deplanchei	250

Species	Seedling quantity
Dysoxylum fraserianum	250
Endiandra discolor	250
Ficus fraseri	250
Ficus obliqua	250
Macadamia tetraphyllas	250
Planchenella chartacea	250
Podocarpus elatus	250
Stenocarpus sinatus	250
Sygyzium crebrenerve	250
Sygyzium australe	250
Sygyzium oleosum	250
Sygyzium francisii	250
Tristaniopsis laurina	250
Eucalyptus acmenoides	250
Eucaluptus propinqua	250

Species	Seedling quantity
Syncarpia glomulifera	250
Angophora costata	250
Sygyzium coryanthum	220
Toona ciliata	200
Acacia concurrens	200
Alectryon tomentosus	200
Dysoxylum mollissimum	100
Dendroxinide photinophylla	50

Appendix 3 – Species List (2023 Planting)

Species	Seedling quantity
Allocasuarina torulosa	240
Dysoxylum frazerianum	240
Eucalyptus tereticornis	240
Glochidion ferdinandi	240
Melaleuca bracteata	240
TOTAL	**1,200**

Appendix 4 – Species List (2024 Planting)

Species	Seedling quantity
Acmena smithii	50
Casuarina glauca	100
Eucalyptus teretacornis	50
Ficus coronata	50
Melaleuca bracteata	100
Melaleuca styphonoides	50
Sygzium francisii	50
TOTAL	**450**

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