SPRING ASSESSMENT (UNDERSTOREY AND TREES) OF 1995, 2005, 2015, 2020 AND 2024 MINE-PIT REHABILITATION AREAS AND FOREST CONTROL PLOTS

- BODDINGTON BAUXITE MINE -

Prepared By

Mattiske Consulting Pty Ltd

Prepared For

South32 Worsley Alumina

Date

May 2026






DOCUMENT STATUS				
DOCUMENT REFERENCE: WOR2402/055/25				
VERSION	**TYPE**	**AUTHOR/S**	**REVIEWER/S**	**DATE DISTRIBUTED**
V1	Internal review	L. Rowles, E. Mattiske	E. Mattiske	
V2	Draft for client	L. Rowles, E. Mattiske	E. Mattiske	8/05/2026
V3	Final	L. Rowles, E. Mattiske	E. Mattiske	21/05/2026

Mattiske Consulting Pty Ltd

(ACN 063 507 175, ABN 39 063 507 175)

PO Box 437
Kalamunda WA 6926
Phone: +61 8 9257 1625
Email: admin@mattiske.com.au

COPYRIGHT AND DISCLAIMER

Copyright

The information contained in this report is the property of Mattiske Consulting Pty Ltd. The use or copying of the whole or any part of this report without the written permission of Mattiske Consulting Pty Ltd is not permitted.

Disclaimer

This report has been prepared on behalf of and for the exclusive use of South32 Worsley Alumina, and is subject to and issued in accordance with the agreement between South32 Worsley Alumina and Mattiske Consulting Pty Ltd. This report is based on the scope of services defined by South32 Worsley Alumina the budgetary and time constraints imposed by South32 Worsley Alumina, and the methods consistent with the preceding.

Mattiske Consulting Pty Ltd has utilised information and data supplied by South32 Worsley Alumina, and sourced from government databases, literature. Departments and agencies in the preparation of this report. Mattiske Consulting Pty Ltd has compiled this report on the basis that any supplied or sourced information and data was accurate at the time of publication. Mattiske Consulting Pty Ltd accepts no liability or responsibility whatsoever for the use of, or reliance upon, the whole or any part of this report by any third party.

TABLE OF CONTENTS

Page

EXECUTIVE SUMMARY **1**

1. INTRODUCTION **11**

1.1. Location and Scope of Project 11
1.2. Environmental Legislation and Guidelines 11

2. BACKGROUND **12**

2.1. Climate 12
2.2. Geology, Soils and Topography 13
2.3. Regional Vegetation 13
2.4. Mine-Pit Rehabilitation 14
2.4.1 1995 Rehabilitation Areas 15
2.4.2 2005 Rehabilitation Areas 15
2.4.3 2015 Rehabilitation Areas 15
2.4.4 2020 Rehabilitation Areas 15
2.4.5 2024 Rehabilitation Areas 16
2.4.6 Forest Control Plots 16

3. OBJECTIVES **16**

4. METHODS **17**

4.1. Field Survey 17
4.2. Survey Timing 18
4.3. Analysis of Site Data 18
4.3.1 Understorey 18
4.3.2 Litter 20
4.3.3 Trees 20
4.3.4 Draft Completion Criteria 20

5. RESULTS **23**

5.1 Understorey 23
5.1.1 Fulfilment of Draft Completion Criteria 23
5.1.2 1995 Rehabilitation (30 years) 26
5.1.3 2005 Rehabilitation (20 years) 31
5.1.4 2015 Rehabilitation (10 years) 36
5.1.5 2020 Rehabilitation (5 years) 41
5.1.6 2024 Rehabilitation (15 months) 47
5.1.7 Comparison of Key Understorey Findings with Forest Control Plots 54
5.1.8 Species Abundance and Frequency 56
5.2 Trees 57
5.2.1 Fulfilment of Draft Completion Criteria 57
5.2.2 Tree Density 60
5.2.3 Tree Height and Diameter (by stem) 72
5.2.6 Tree Condition and Insect Attack 95
5.3. Litter Cover 1995 to 2025 and Forest Control Plots 105
5.4. Bark Depth 105

6. DISCUSSION **106**

7. RECOMMENDATIONS **109**

8. ACKNOWLEDGEMENTS **109**

9. LIST OF PERSONNEL **110**

10. REFERENCES **110**

TABLES

1: Summary of mean native and introduced species richness (alive and dead per 80 m²) of Rehabilitation areas and Forest Control Plots monitored in 2025

2: Summary of mean alive and dead native plant density/m² (± s.e.) and native foliage cover (%) of Rehabilitation areas and Forest Control Plots monitored in 2025

3: Summary of mean tree densities and understorey (annual and perennial) categories within 2024 Rehabilitation areas at 15 months against set Key Performance Indicators (KPIs)

4: Summary of trees in mine-pit Rehabilitation areas aged 1, 5, 10, 20 and 30 years monitored in September/November 2025 at Boddington Bauxite Mine

5a: Summary of the flora and vegetation rehabilitation draft completion criteria (excluding 15 month monitoring)

5b: Summary of the native flora and vegetation rehabilitation draft completion criteria for 15 month monitoring

6a: Summary of understorey rehabilitation at 30, 20, 10 and 5 years old and at 15 months old assessed against draft completion criteria in 2025

6b: Understorey (excluding tree species) rehabilitation at 30, 20, 10 and 5 years old by pit assessed against draft completion criteria in 2025

6c: Rehabilitation (annual/perennial native species, including tree species) in 15 months old assessed against Key Performance Indicators (KPI) in 2025

7a: Summary of mean native and introduced species richness (alive and dead per 80 m²) of 1995 Rehabilitation areas monitored in 2025

7b: Summary of mean alive and dead plant density/m² (± s.e.) and mean alive and dead foliage cover (%) of 1995 Rehabilitation areas monitored in 2025

7c: Summary of Shannon-Wiener Diversity indices (H') for both density and cover and Hierarchical Richness Index (HRI) values for alive plants in 1995 Rehabilitation areas monitored in 2025

8a: Summary of mean native and introduced species richness (alive and dead per 80 m²) of 2005 Rehabilitation areas monitored in 2025

8b: Summary of mean alive and dead plant density/m² (± s.e.) and mean alive and dead foliage cover (%) of 2005 Rehabilitation areas monitored in 2025

8c: Summary of Shannon-Wiener Diversity indices (H') for both density and cover and Hierarchical Richness Index (HRI) values for alive plants in 2005 Rehabilitation areas monitored in 2025

9a: Summary of mean native and introduced species richness (alive and dead per 80 m²) of 2015 Rehabilitation areas monitored in 2025

9b: Summary of mean alive and dead plant density/m² (± s.e.) and mean alive and dead foliage cover (%) of 2015 Rehabilitation areas monitored in 2025

9c: Summary of Shannon-Wiener Diversity indices (H') for both density and cover and Hierarchical Richness Index (HRI) values for alive plants in in 2015 Rehabilitation areas monitored in 2025

10a: Summary of mean alive native and introduced species richness (per 80 m²) of 2020 Rehabilitation areas monitored in 2025

10b: Summary of mean alive and dead plant density/m² (± s.e.) and mean alive and dead foliage cover (%) of 2020 Rehabilitation areas monitored in 2025

10c: Summary of Shannon-Wiener Diversity indices (H') for both density and cover and Hierarchical Richness Index (HRI) values for alive plants in in 2020 Rehabilitation areas monitored in 2025

11a: Summary of mean alive native and introduced species richness (per 80 m²) of 2024 Rehabilitation areas monitored in 2025

11b: Summary of mean alive and dead plant density/m² (± s.e.) and mean alive and dead foliage cover (%) of 2024 Rehabilitation areas monitored in 2025

11c: Summary of Shannon-Wiener Diversity indices (H') for both density and cover and Hierarchical Richness Index (HRI) values for alive plants in in 2024 Rehabilitation areas monitored in 2025

12a: Comparison of mean native and introduced species richness (alive and dead per 80m2) of Rehabilitation areas and Forest Control Plots monitored in 2025

12b: Summary of alive and dead native plant density (per m² ± s.e.) and native foliage cover (%) of Rehabilitation areas monitored in 2025

13a: Summary of mean tree density within 2024 rehabilitation areas at 15 months against set Key Performance Indicators (KPIs)

13b: Summary of rehabilitation at 30, 20, 10 and 5 years old assessed against draft completion criteria in 2025

13c: Summary of mature tree densities(excluding seedlings) at 30, 20, 10 and 5 years old by pit assessed against draft completion criteria in 2025

13d: Summary of mature tree densities(excluding seedlings) on Forest Control Plots in 2025

13e: Summary of seedling tree densities(excluding seedlings) on Forest Control Plots in 2025

TABLES

14: Mean annual height and DBH growth rates (cm/year) of tree species assessed in 2025

15: Proportion (%) of each health condition category for seedlings in areas rehabilitated in 2024, following assessment in 2025

FIGURES

1a: Rainfall and temperature data for the Bannister and Wandering weather stations

1b: Long Term Rainfall trends at Bannister (1991 to 2025) weather station

2a: Mean native species richness (alive and dead species/80 m² ± s.e.) for the 1995 (30 years) Rehabilitation areas

2b: Mean of alive native species richness /80 m² ± s.e. for the 30-year-old rehabilitation areas over time

2c: Mean alive and dead native and introduced plant density (per m² ± s.e.) for the 1994 (30 years) rehabilitation areas

2d: Mean alive native species density/80 m² ± s.e. for the 30 years rehabilitation areas over time

2e: Mean alive and dead native and introduced foliage cover (% ± s.e.) for the 1995 (30 years) rehabilitation areas

2f: Mean alive native foliage cover/80 m² ± s.e. for the 30 years rehabilitation areas over time

2g: Mean Shannon-Wiener Diversity indices (H') for alive (combined native and introduced) density and alive foliage cover for the 1995 rehabilitation areas over time

2h: Hierarchical Richness Index (HRI) for alive native plants in the 1995 rehabilitation areas over time

3a: Mean of alive native and introduced species richness /80 m² ± s.e. for the 2005 (20 years) rehabilitation areas

3b: Mean alive native species richness (/80 m² ± s.e.) for the current assessment (2024) of 20-year-old rehabilitation (rehabilitation year 2005) and from previous assessments of 20-year-old rehabilitation

3c: Mean alive and dead native and introduced plants per m² ± s.e. for the 2005 (20 years) rehabilitation areas

3d: Mean alive native plant density (per m² ± s.e.) for the 2004 (20 years) rehabilitation areas over time

3e: Mean alive and dead native and introduced foliage cover (% ± s.e.) for the 2005 (20 years) rehabilitation areas

3f: Mean alive native foliage cover /80 m² ± s.e., for the current assessment (2025) of 20-year-old rehabilitation (rehabilitation year 2005) and from previous assessments of 20-year-old rehabilitation

3g: Mean H' for alive (combined native and introduced) density and foliage cover for the 2005 (20 years) rehabilitation areas over time

3h: Hierarchical Richness Index (HRI) for alive native plants in the 2005 rehabilitation areas over time

4a: Mean native species richness (alive and dead species/80 m² ± s.e.) for the current assessment (2025) of 10-year-old rehabilitation (rehabilitation year 2015) and from previous assessments of 10-year-old rehabilitation

4b: Mean native and introduced alive species richness (species/80 m² ± s.e.) for the 2015 (10 years) rehabilitation areas

4c: Mean alive plant density (alive and dead species/80 m² ± s.e.) for the current assessment (2025) of 10-year-old rehabilitation (rehabilitation year 2015) and from previous assessments of 10-year-old rehabilitation

4d: Mean alive and dead native and introduced plant density (per m² ± s.e.) for the 2015 (10 years) rehabilitation areas

4e: Mean alive foliage cover (alive and dead species/80 m² ± s.e.) for the current assessment (2025) of 10-year-old rehabilitation (rehabilitation year 2015) and from previous assessments of 10-year-old rehabilitation

4f: Mean alive and dead native and introduced foliage cover (% ± s.e.) for the 2015 (10 years) rehabilitation areas

4g: Mean Shannon-Wiener Diversity indices (H') for alive (combined native and introduced) density and foliage cover for the 2015 (10 years) rehabilitation areas over time

4h: Hierarchical Richness Index (HRI) for alive native plants in the 2015 rehabilitation areas over time

5a: Mean native species richness (alive and dead species/80 m² ± s.e.) for the current assessment (2025) of 5-year-old rehabilitation (rehabilitation year 2020) and from previous assessments of 5-year-old rehabilitation

5b: Mean native and introduced species richness (species/80 m² ± s.e.) for the 2020 (5 years) rehabilitation areas over time

5c: Mean alive plant density (/80 m² ± s.e.) for the current assessment (2025) of 5-year-old rehabilitation (rehabilitation year 2020) and from previous assessments of 5-year-old rehabilitation

5d: Mean alive and dead native and introduced plant density (per m² ± s.e.) for the 2020 (5 years) rehabilitation areas over time

5e: Mean alive foliage cover (/80 m² ± s.e.) for the current assessment (2025) of 5-year-old rehabilitation (rehabilitation year 2020) and from previous assessments of 5-year-old rehabilitation

5f: Mean alive and dead native and introduced alive foliage cover (% ± s.e.) for the 2020 (5 years) Rehabilitation areas over time

5g: Mean Shannon-Wiener Diversity indices (H') for alive (combined native and introduced) density and foliage cover for the 2020 (5 years) Rehabilitation areas over time

5h: Hierarchical Richness Index (HRI) for alive native plants in the 2020 Rehabilitation areas over time

FIGURES (continued)

6a: Mean native species richness (alive and dead species/80 m² ± s.e.) for the current assessment (2025) of 15-month rehabilitation (rehabilitation year 2024) and from previous assessments of 15-month-old rehabilitation areas

6b: Mean alive and dead native and introduced plant density (per m² ± s.e.) for the 2024 (15 month) rehabilitation areas over time

6c: Mean native and introduced alive foliage cover (% ± s.e.) for the 2024 (15 month) rehabilitation areas

7a: Summary of Shannon – Wiener Diversity Indices over time on Forest Control Plots

7b: Summary of Heirarchial Richness Indices over time on Forest Control Plots

8a: Mean density (± se) of alive seedlings (<130 cm in height) in areas rehabilitated in 1995, following assessments in 1996, 1996, 2005, 2010, 2015 and 2025

8b: Mean density (± se) of alive trees (≥130 cm in height) in areas rehabilitated in 1995, following assessments in 1996, 1996, 2005, 2010, 2015 and 2025

8c: Mean density (± se) of alive seedlings (<130 cm in height) in areas rehabilitated in 2005, following assessments in 2006, 2009, 2012, 2015 and 2025

8d: Mean density (± se) of alive trees (≥130 cm in height) in areas rehabilitated in 2005, following assessments in 2006, 2009, 2012, 2015 and 2025

8e: Mean density (± se) of alive seedlings (<130 cm in height) in areas rehabilitated in 2015, following assessments in 2016, 2020 and 2025

8f: Mean density (± se) of alive trees (≥130 cm in height) in areas r rehabilitated in 2015, following assessments in 2016, 2020 and 2025

8g: Mean density (± se) of alive seedlings (<130 cm in height) in areas rehabilitated in 2020, following assessments in 2021 and 2025

8h: Mean density (± se) of alive trees (≥130 cm in height) in areas rehabilitated in 2020, following assessments in 2021 and 2025

8i: Mean density (± se) of alive seedlings and trees (No./ha) per species recorded for the 2024 rehabilitation plots during the 2025 assessment

8j: Total density of alive seedlings (No./ha) per species recorded in the Forest Control Plots during the 1998, 1999, 2000, 2002, 2007, 2016, 2019, 2022, 2023, 2024 and 2025 assessments

8k: Total density of alive trees (No./ha) per species recorded in the Forest Control Plots during the 1998, 1999, 2000, 2002, 2007, 2016, 2019, 2022, 2023, 2024 and 2025 assessments

9a: Mean height (cm) of alive trees (all stems ≥130 cm in height ± se) in areas rehabilitated in 1995, following assessments in 1999, 2005, 2010, 2015 and 2025

9b: Mean height (cm) of alive trees (all stems ≥130 cm in height ± se) in areas rehabilitated in 2005, following assessments in 2009, 2012, 2015 and 2025

9c: Mean height (cm) of alive trees all stems (≥130 cm in height ± se) in areas rehabilitated in 2015, following assessments in 2016, 2020 and 2025

9d: Mean height (cm) of alive trees (all stems ≥130 cm in height ± se) in areas rehabilitated in 2020, following assessments in 2021 and 2024

9e: Mean height (cm) of alive seedlings (all stems <130 cm in height) in areas rehabilitated in 2024, following assessments in 2025

9f: Mean height (cm) of alive trees (all stems ≥130 cm in height ± se) in Forest Control Plots in 1998, 1999, 2000, 2002, 2007, 2016, 2019, 2022, 2023, 2024 and 2025

9g: Mean DBH (cm) of alive trees (all stems ≥130 cm in height ± se) in areas rehabilitated in 1995, following assessments in 1999, 2005, 2010, 2015 and 2025

9h: Mean DBH (cm) of alive trees (all stems ≥130 cm in height ± se) in areas rehabilitated in 2005, following assessments in 2009, 2012, 2015 and 2025

9i: Mean DBH (cm) of alive trees (all stems ≥130 cm in height ± se) in areas rehabilitated in 2015, following assessment in 2020 and 2025

9j: Mean DBH (cm) of alive trees (all stems ≥130 cm in height ± se) in areas rehabilitated in 2020, following assessments in 2025

9k: Mean DBH (cm) of alive trees (all stems ≥130 cm in height ± se) in Forest Control Plots in 1998, 1999, 2000, 2002, 2007, 2016, 2019, 2023, 2024 and 2025

10: Mean annual height and DBH growth rates (cm/year) of alive tree species in 1995 rehabilitation areas as assessed in 2005, 2015 and 2025

FIGURES (continued)

11a: Mean number of stems (± se) in areas rehabilitated in 1995, following assessments in 1999, 2005, 2010, 2015 and 2025

11b: Mean number of stems (± se) in areas rehabilitated in 2005, following assessments in 2009, 2012, 2015 and 2025

11c: Mean number of stems (± se) in areas rehabilitated in 2015, following assessments in 2016, 2020 and 2025

11d: Mean number of stems (± se) in areas rehabilitated in 2020, following assessments in 2025

11e: Mean alive number of stems (≥130 cm in height) in Forest Control plots in 1998, 1999, 2000 , 2002, 2007, 2016, 2019, 2022, 2023, 2024 and 2025

12a: Mean bole height per alive tree in areas rehabilitated in 1995 following assessment in 2015 (20 years), 2025 (30 years)

12b: Mean bole height per alive tree in areas rehabilitated in 2005 following assessment in 2025 (20 years)

12c: Mean bole height per alive tree in areas rehabilitated in 2015 following assessment in 2025 (10 years)

12d: Mean bole height per alive tree in areas rehabilitated in 2020 following assessment in 2025 (5 years)

12e: Mean bole height per alive trees in Forest Control Plots in 2022, 2024 and 2025

13a: Proportion (%) of each health condition category for trees and seedlings in areas rehabilitated in 1995, following assessments in 1996, 1999, 2005, 2010, 2015 and 2025

13b: Proportion (%) of each health condition category for trees and seedlings in areas rehabilitated in 2005, following assessments in 2006, 2009, 2012, 2015 and 2025

13c: Proportion (%) of each health condition category for trees and seedlings in areas rehabilitated in 2015, following assessments in 2016, 2020 and 2025

13d: Proportion (%) of each health condition category for trees and seedlings in areas rehabilitated in 2020, following assessments in 2021 and 2025

13e: Proportion of each health condition category for trees and seedlings in areas rehabilitated in 2024, following assessment in 2025

13f: Proportion of each health condition category for trees and seedlings in the eight Forest Control Plots in 1998, 1999, 2000, 2002, 2007, 2016, 2019, 2022, 2023, 2024 and 2025

14a: Proportion (%) of tree species affected by insect attack in areas rehabilitated in 1995, following assessments in 1996, 1999, 2005, 2010. 2015, 2020 and 2025

14b: Proportion (%) of tree species affected by insect attack in areas rehabilitated in 2005, following assessments in 2006, 2009, 2012, 2015 and 2025

14c: Proportion (%) of tree species affected by insect attack in areas rehabilitated in 2015 following assessments in 2016, 2020 and 2025

14d: Proportion (%) of tree species affected by insect attack in areas rehabilitated in 2020, following assessments in 2021 and 2025

14e: Proportion (%) of tree species affected by insect attack in areas rehabilitated in 2024, following assessment in 2025

14f: Proportion (%) of tree species affected by insect attack in Forest Control Plots in 1998, 1999, 2000, 2002, 2007, 2016, 2019, 2022, 2023, 2024 and 2025

15: Review of % Cover of Litter, 1995 to 2024 rehabilitation areas and control areas (FMPs)

APPENDICES

A1: Threatened and Priority Flora definitions

A2: Threatened and Priority Ecological Community definitions

A3: Categories and Control Measures of Declared Pest (Plant) Organisms in Western Australia

A4: Other Definitions

B: Summary of Monitoring Recording Times for Plots in the Forest and Rehabilitation Areas

C: Frequency of 2025 records of Vascular Flora in Rehabilitation Years

ABBREVIATIONS

BAM Act:	*Biosecurity and Agriculture Management Act 2007* (WA)
BBM:	Boddington Bauxite Mine
BC Act:	*Biodiversity Conservation Act 2016* (WA)
DBCA:	Department of Biodiversity, Conservation and Attractions (WA)
DBH:	Diameter at Breast Height
DCCEEW:	Department of Climate Change, Energy, the Environment and Water
EP Act:	*Environmental Protection Act 1986* (WA)
EPA:	Environmental Protection Authority (WA)
EPBC Act:	*Environmental Protection and Biodiversity Conservation Act 1999* (Commonwealth)
H':	Shannon-Wiener Diversity Index
HRI:	Hierarchical Richness Index
KPI:	Key Performance Indicator
LTA:	Long Term Average
Mattiske:	Mattiske Consulting Pty Ltd
WAH:	Western Australian Herbarium (PERTH)

EXECUTIVE SUMMARY

Mattiske Consulting Pty Ltd was commissioned by South32 Worsley Alumina Pty Ltd in 2025 to assess the flora and vegetation in areas rehabilitated during the 1995, 2005, 2015, 2020 and 2024 bauxite mine-pit rehabilitation program at the Boddington Bauxite Mine. Eight control plots were re-assessed in the forest areas. Five of these forest monitoring plots (FMPs) were within the Mt Saddleback area, one within the Marradong forest area and two within the Quindanning forest areas. The understorey and trees were monitored during the months of September to November 2025 and the results of each are presented in this report. Results from this assessment provide information on the ongoing progression and development of rehabilitated areas. These data are essential to allow ongoing improvements to the rehabilitation process at the Boddington Bauxite Mine. The 2025 monitoring report reviews the rehabilitation draft completion criteria based on the 1986 to 2025 datasets and will enable a more efficient monitoring and reporting process in surveys to come.

Understorey

1995 Areas (30 years)

The following key findings were recorded in the 1995 rehabilitation areas (6 plots):

- Eight-eight native plant species and twelve introduced plant species were recorded in the spring months of 2025. There was a marked reduction in introduced species as is evident from absence in density and foliage cover results in 2025. The only plot that had a higher range of introduced species was FAW MP09 which occurs on private property. If this plot is excluded in the mean of introduced species the average decreases from 2.50 ± 1.74 to 0.83 ± 0.47.
- No threatened flora pursuant to the BC Act 2016 and as listed by the DBCA (2026b), or pursuant to the EPBC Act 1999 and listed by the DCCEEW (2026) were recorded within the 1995 rehabilitation areas.
- No Priority flora species were recorded in 2025 on 1995 rehabilitation areas.
- Within the 1995 rehabilitation areas assessed in 2025, native species richness ranged from 25 – 51 species/80 m² w while that for introduced species ranged from 0 to 10 species/80 m². Overall, the 1995 rehabilitation areas had a mean native species richness of 34.33 ± 3.99 species/80 m². Mean native species richness within the 1995 rehabilitation areas for the same plots monitored in between 1996 and 2025 shows a consistency in numbers around the 30 to 40 species with a slight decrease in 2025 of native species.
- In the 1995 rehabilitation plots monitored in 2025, the mean alive native plant density ranged from 2.00 ± 0.29 plants/ m² to 11.44 ± 0.99 plants/ m² and that of alive introduced plants were below 1.00 plants/ m² on all plots in 2025. The range of alive native species increases if the plot on the private property is excluded in the averages. The mean density of alive plants on the transects as re-monitored in 2025 illustrated a decrease since 2005. The number of introduced plants in the respective transects decreased over time.
- Mean alive foliage cover recorded for these areas in 2025 was slightly lower than the previous monitoring in 2015. Of the six 1995 rehabilitation plots monitored in 2025, plot NE02 MP07 recorded the highest mean alive foliage cover of native species (59.95% ± 5.22) whilst plot FAW MP09 on private property had the lowest (14.74% ± 3.69). Overall, the 1995 rehabilitation areas had a mean alive native foliage cover of 32.94% ± 2.18 and an alive introduced cover of 0.12% ± 0.09. If FAW MP09 is excluded then the overall mean alive foliage cover increases to 36.58% ± 2.18. Overall, the foliage cover in 2025 was lower than previous 30-year assessments of the different rehabilitation ages. The latter may relate to the loss of some of the foliage cover in 2025.
- Both the Shannon-Wiener Diversity indices (H') for density and foliage cover for 1995 rehabilitation areas have been variable between assessments. However, H' for density and cover were slightly lower in 2025 for 1995 areas.
- The Hierarchical Richness Index (HRI) value for the 1995 rehabilitation areas decreased slightly in 2025 from earlier higher recordings in 1996, 2010 and 2015; with the highest in NE02 MP07 in 2025.

2005 Areas (20 years)

The following key findings were recorded in the 2005 rehabilitation areas (6 plots):

- One hundred and thirteen native plant species were recorded, and four introduced plant species were recorded in 2025. All introduced species are annual species that establish after seasonal rains.
- No threatened flora pursuant to the BC Act 2016 and as listed by the DBCA (2026b), or pursuant to the EPBC Act 1999 and listed by the DCCEEW (2026) were recorded within the 2005 rehabilitation areas.
- No Priority flora species were recorded in 2025 on 2005 rehabilitation areas.
- Within the 2005 rehabilitation areas in the 2025 assessment, native and introduced species richness ranged from 40 – 59 species/80 m² and 0 – 3 species/80 m² respectively, plot SE MP15 recording the highest native species richness of 59 species/80 m². The results for the sampled plots was slightly lower in 2025 than in 2015. Overall, the mean native species richness recorded in 2025 for the 2005 rehabilitation areas was 49.50 ± 3.27 species/80 m². Mean native species richness in these 20-year-old plots in 2024 areas was similar to other 20-year-old rehabilitation.
- Mean alive plant density of native species was the greatest within plots NSS MP01 (7.09 ± 0.70 plants/m²) and lowest within plot N18 MP06 (3.59 ± 0.44 plants/m²). The overall mean native alive plant density recorded for the areas was 5.12 ± 0.49 plants/m², whilst for mean native dead plant density it was 0.54 ± 0.08 plants/m². When compared with previous assessments of 20-year-old rehabilitation, the alive native density results were lower than the peaks of over 10 plants /m^2.
- Mean alive foliage cover of native species recorded in 2025 (39.88%) was lower than the recent assessments of 20-year-old areas. The mean alive foliage cover of introduced species was 0.005%; being consistent with the decline in introduced species in older rehabilitation areas. Mean native alive foliage cover was highest within N10.6 MP02 (55.90% ± 6.59) and was lowest within N18 MP06 (20.06% ± 4.66).
- The Shannon-Wiener Diversity indices H' values for both density and foliage cover as assessed in 2025 within the 2005 rehabilitation areas were amongst the highest when compared with previous surveys for the same areas. The highest indices recorded for the density and foliage cover in 2025 was in plots SE MP15 and SW01 MP10 respectively.
- The highest Hierarchical Richness Index (HRI) value for the 2005 rehabilitation areas, as assessed in 2025, was calculated for plot NSS MP01. The 2025 assessment of HRI was slightly lower than the 2015 results.

2015 Areas (10 years)

The following key findings were recorded in the 2015 rehabilitation areas (6 plots):

- One hundred and twenty native and eleven introduced species were recorded, all introduced species are annual species that establish after seasonal rains.
- No threatened flora pursuant to the BC Act 2016 and as listed by the DBCA (2026b), or pursuant to the EPBC Act 1999 and listed by the DCCEEW (2026) were recorded within the 2014 rehabilitation areas.
- Three Priority flora species (*Hibbertia ambita* P1, *Stylidium marradongense* P3 and *Lasiopetalum cardiophyllum* P4) were recorded in the 2015 rehabilitation areas in 2025. Thirteen plants of *Hibbertia ambita* (P1) were recorded in plots ME03-22 MP03 and fourteen plants of *Hibbertia ambita* (P1) in WS08 MP20. Two plants of *Stylidiium marradongense* (P3) were recorded in SW47 Plot MP15 and seven plants of *Lasiopetalum cardiophyllum* (P4) were recorded in SW35 MP14 2025.
- Within the 2015 rehabilitation areas the native and introduced species richness recorded in 2025 ranged from 35 to 55 species/80 m² and 0 – 6 species/80 m² respectively, with SW47 MP15 recording the highest at 55 native species/80 m². Overall, the mean native species richness recorded in 2025 for the 2015 rehabilitation areas was 47.00 ± 2.89 species/80 m². Mean native species richness across previous assessments of 10 year old rehabilitation was similar to previous years, with the lowest values occurring in the 2002, 2007 rehabilitation areas.

- Mean native alive plant density in the 2015 rehabilitation areas assessed in 2025 was greatest in SW47 MP15 with 9.94 ± 2.10 plants/m² and noticeably lowest in MN34/10-V2 with 1.85 ± 0.37 plants/m². The overall mean native alive plant density recorded in 2025 for the 2015 rehabilitation areas (5.70 ± 0.51 plants/m²) is lower than in some previous years when compared to previous assessments of 10 year rehabilitation. When compared to previous assessments of the same 2015 rehabilitation areas, the mean combined native and introduced alive plant density for the 2025 assessment was higher than in the previous assessment in 2014. The density of introduced species was lower at 0.48 ± 0.13 plants/m².
- Mean native alive foliage cover in the 2015 rehabilitation assessments in 2025 was greatest in SW47 MP15 (55.44% ± 4.81), and lowest in WS08 MP20 with 29.61% ± 5.85. When compared with previous assessments of 10 year old rehabilitation, this year's overall mean native alive foliage cover (40.51% ± 2.11) was in the lower range of previous years. When compared to previous assessments of 10 year old areas, the 2025 mean combined alive and dead foliage cover was similar to 1993. The mean alive foliage cover of introduced species was 0.14% ± 0.07; being consistent with the decline in introduced species in older rehabilitation areas.
- The Shannon –Wiener Diversity Indices (H') values for both density and foliage cover as assessed in 2025 within the 2015 rehabilitation areas was similar to levels in previous surveys for the same areas. Plot SW21 MP11 had the highest H' for density (3.45) and SW21 MP1 (2.86) had the highest cover recorded in 2025.
- The highest Hierarchical Richness Index (HRI) value for the 2015 rehabilitation areas, as assessed in 2025, was calculated for SW47 MP15. Of all the assessments of 2015 rehabilitation areas, the 2025 assessment of HRI was higher than in 2016 and 2020.

2020 Areas (5 years)

The following key findings were recorded on the 2020 rehabilitation areas (6 plots):

- One hundred and twenty-five native and eighteen introduced plant species were recorded, all introduced species are annual species that establish after seasonal rains.
- No threatened flora pursuant to the BC Act 2016 and as listed by the DBCA (2026b), or pursuant to the EPBC Act 1999 and listed by the DCCEEW (2026) were recorded within the 2019 rehabilitation areas.
- Four plants of *Hibbertia ambita* (P1) were recorded in 2020 rehabilitation areas in plot ME12 MP07 in 2025.
- Within the 2020 rehabilitation areas the native and introduced species richness recorded in 2025 ranged from 24 – 67 species/80 m² and 0 – 14 species/80 m² respectively, with plot WM056 MP28 having the highest native species richness. Overall, the mean native species richness recorded in this year's assessment for the 2020 rehabilitation areas was 50.00 ± 6.10 species/80 m². Mean species richness for the 2020 rehabilitation year (as assessed in 2025) was within the mid-range of species richness for previous 5 year old rehabilitation assessments. Compared with the previous assessment (2021) of the same 2010 rehabilitation areas, the mean native alive and dead species richness in 2025 was similar for native species but had declined slightly for both native and introduced species.
- Mean native alive plant density in the 2020 rehabilitation areas as assessed in 2025 was highest in SW107 MP25 with 7.98 ± 1.06 plants/m² and lowest in MNE35 MP05 with 4.00 ± 0.71 plants/m². Mean introduced alive plant density was highest in MNE35 MP05 with 7.38 ± 1.58 plants/m² and lowest in WM056 MP28 with 0.00 ± 0.00 plants/m². Mean alive plant density for the 2020 rehabilitation areas as recorded in this year's assessment (5.30 ± 0.31 plants/m²) was one of the lowest when compared to previous assessments of other 5 year old rehabilitation. The mean alive native density recorded in 2025 for the 2020 rehabilitation areas was amongst the lowest in similar aged rehabilitation areas.
- Mean native alive foliage cover in the 2020 rehabilitation areas recorded in 2025 was highest SW107 MP25 with 68.52% ± 7.07, whilst the lowest was recorded in ME12 MP07 with 21.73% ± 3.10. When compared with previous assessments of other 5 year old rehabilitation, this year's overall mean native alive foliage cover (37.62% ± 2.44) was similar to that in the previous years. In the 2020 rehabilitation areas, the mean combined native alive foliage cover measured in 2024 was similar to previous years at 5 years with an increase in growth

- Plot WM056 MP28 had the highest Shannon –Wiener Diversity Indices H' for density (3.39) and Plot ME12 MP07 had the highest for cover (2.99) recorded in 2025. When compared to the previous (2021) assessment of the same 2020 rehabilitation areas, H' for the density and cover was lower in 2025.

- The highest Hierarchical Richness Index (HRI) value for the 2020 rehabilitation areas, as assessed in 2025, was calculated for plot SW107 MP25. Of all the assessments of 2020 rehabilitation areas, the 2025 assessment of HRI was lower than in the previous assessment in 2021

2024 Areas (15 months)

The following key findings were recorded on the 2024 rehabilitation areas (39 plots):

- Two hundred and thirty-six native and thirty-five introduced plant species were recorded on 2024 rehabilitation areas in 2025. Most of introduced species are annual species that establish after seasonal rains.
- No threatened flora pursuant to the BC Act 2016 and as listed by the DBCA (2026b), or pursuant to the EPBC Act 1999 and listed by the DCCEEW (2026) were recorded within the 2023 rehabilitation areas.
- One *Lasiopetalum cardiophyllum* (P4) as listed by the DBCA (2025a) was recorded in the 2024 rehabilitation areas in SW52 MP20 in 2025.
- Within the 2024 rehabilitation areas, mean native species richness recorded in 2025 ranged from 32 - 76 species/80 m². Introduced species richness ranged from 0–13 species/80 m² within the 2024rehabilitation areas. The overall mean native species richness for all 2024 rehabilitation plots assessed in 2025 was 51.03 ± 1.75 species/80 m² for all plots and pits. The mean native species richness for the 2024 rehabilitation areas was relatively high when compared with some of the previous assessments at 15 months,
- Mean native alive plant density in the 2024 rehabilitation areas recorded in 2025 was the highest in pit WS2E MP40 (12.83 ± 1.45 plants/m²). The overall mean native alive density was 6.56 ± 0.14 plants/m^2 for all plots. The lowest mean alive plant density was recorded in WM056-S6 MP33 (2.55 ± 0.27 plants/m²). Only one plot in forest areas was below the 3 plants/m2; namely WM056-S6 MP33. The highest mean introduced alive plant density was recorded in WM056-S6 MP35 (4.91 ± 0.90 plants/m²).
- Mean native alive foliage cover for the 2024 rehabilitation areas was highest in SE108 MP17 with 36.52% ± 4.98. The lowest mean native alive plant foliage cover was recorded in QU02 MP05 (0.66% ± 0.11). The overall mean alive native plant foliage cover was 9.56% ± 1.28. The highest mean introduced alive foliage cover was recorded in WM056-S6 MP31 with 2.20% ± 0.82), much higher than the mean of all 2024 rehabilitation plots assessed in 2025 (0.23% ± 0.12).
- The Shannon-Wiener Diversity Index (H') based on plant density within the 2024 rehabilitation areas ranged from 2.13 to 3.51. Based on foliage cover data, H' within the 2024 rehabilitation areas ranged from 0.48–3.18. These results were similar to the range in previous 15 month assessments.
- The highest Hierarchical Richness Index (HRI) value for the 2024 rehabilitation areas, as assessed in 2025, was calculated for WS2E MP40 and the lowest was recorded in WM056-S6 MP33.

Forest Control Areas

The following key findings were recorded on the 4 forest control plots in 2025:

- One hundred and seventy-nine native and 7 introduced plant species were recorded, all introduced species are annual species that establish after seasonal rains.
- No threatened flora pursuant to the BC Act 2016 and as listed by the DBCA (2026b), or pursuant to the EPBC Act 1999 and listed by the DCCEEW (2026) within the forest monitoring plots in 2025.
- *Hibbertia ambita* P1 was recorded in the Mt Saddleback forest monitoring plot (FMP114) and *Stylidium marradongense* P3 was recorded in the Mt Saddleback forest monitoring plots (FMP108, FMP110 and FMP114) in 2025.

- The results reflect a similar range of native species on the rehabilitation areas (34 to 51) when compared with the control forest plots (mostly 44 to 72). In contrast the range of introduced species on the rehabilitation areas is higher than on the control plots, and the trend of introduced species decreases with increasing age of the rehabilitation areas. The latter pattern of introduced species reflects the lower range of introduced species in the less disturbed forest areas.
- Mean native densities in 2025 in the forest control plots was 11.99 ± 1.58 plants/m², which was higher than the densities of native species in the rehabilitation areas.
- Mean native alive foliage cover in 2025 in the forest control plots was 21.30% ± 1.58. When compared with the rehabilitation areas the results for native foliage on the forest monitoring plots was generally lower in 2025 than the rehabilitation areas; except for the lower initial growth on the 15 month areas.
- The Shannon –Wiener Diversity Indices (H') values for both density and foliage cover as assessed in 2025 for the forest control plots were amongst the highest when compared with previous assessments on control areas.
- The Hierarchical Richness Index (HRI) as assessed in 2025 for the forest control plots was similar to the mid-range values when compared with previous assessments on control areas.

As a result of the assessment of rehabilitation and forest control plots in 2025 a range of Priority species were recorded including *Hibbertia ambita* (P1), *Stylidium marradongense* (P3), *Lasiopetalum cardiophyllum* (P4).

The species richness data for the rehabilitation areas is summarized in Table 1. The low number of native species in the 1995 rehabilitation areas at 30 years was lower than species richness levels of native species in other younger rehabilitation areas. As indicated above for the more recent rehabilitation areas, treated in 2020 and 2024 reflected higher range of introduced species. As indicated previously many of the introduced species are relatively small and short lived and as such do not persist as the native species establish and persist. The lowest levels of introduced species was recorded in the 2005 and 1995 rehabilitation areas supporting the concept that over time many of the introduced species decrease. The mean species richness of native species in the rehabilitation areas is lower than in the forest control plots. The 30-year old rehabilitation areas were lower than the other rehabilitation areas and this supports earlier trends in different monitoring periods. The mean species richness of introduced species in the rehabilitation areas remained mostly higher than in three of the forest control plots.

Table 1: Summary of mean native and introduced species richness (alive and dead per 80 m²) of Rehabilitation areas and Forest Control Plots monitored in 2025

(Note: PP – Private Property areas)

Age in years (rehabilitation year)	Mean Species Richness per 80 m²	
	Native	Introduced
1 (2024)	51.03 ± 1.75	6.77 ± 0.62
5 (2020)	50.00 ± 6.10	4.67 ± 2.03
10 (2015)	47.00 ± 2.89	3.33 ± 0.76
20 (2005)	49.50 ± 3.27	1.33 ± 0.37
30 (1995)	34.33 ± 3.99 (35.60 ± 4.63 if PP areas excluded)	2.50 ± 1.74 (1.00 ± 0.55 if PP areas excluded)
Forest Control Plots and Site-Vegetation Type (2025 data)		
FMP091 – ST/19JSd	45	2
FMP108 – H/19JPs	65	0
FMP110 – P/19JLc	60	1
FMP112 – ST/19JSd	47	0
FMP114 – S/19JBg	65	0
MMP08A-V2 – P/19JLc	72	6
QMP01 – P/19JLc	44	0
QMP02 – H1/19jPS1	45	2
Overall Mean	55.38 ± 4.00	1.38 ± 0.73

The density and foliage cover of native plants in the rehabilitation areas is summarized in Table 2. Lower native foliage cover results in the 2024 rehabilitation areas is consistent with initial growth phase after 15 months. The other results showed variable density results in 2005 to 2020 areas and a higher foliage cover in the 5-year, 10-year and 20-year aged rehabilitation areas. The latter largely reflects the balance between seedlings and the growth of larger shrubs over time. The densities of native plants are lower than the forest areas. The foliage cover in the older rehabilitation areas exceeds or is comparable with the range on the forest control plots.

Table 2: Summary of mean alive and dead native plant density/m² (± s.e.) and native foliage cover (%) of Rehabilitation areas and Forest Control plots monitored in 2025

(Note: PP – Private Property areas)

Age	Mean Native Plant Density No. Plants/m² ± s.e.		Mean Native % Foliage Cover ± s.e.	
	Alive	Dead	Alive	Dead
1 (2024)	6.56 ± 0.14	0.38 ± 0.05	9.56 ± 1.28	0.03 ± 0.01
5 (2020)	5.30 ± 0.31	0.23 ± 0.06	37.62 ± 2.44	2.64 ± 0.69
10 (2015)	5.70 ± 0.51	0.48 ± 0.05	40.51 ± 2.11	12.39 ± 1.39
20 (2005)	5.12 ± 0.49	0.54 ± 0.08	39.88 ± 3.08	15.28 ± 2.13
30 (1995)	6.16 ± 0.39 (6.99 ± 0.42 if PP areas excluded)	0.49 ± 0.05 (0.58 ± 0.06 if PP areas excluded)	32.94 ± 2.18 (36.58 ± 2.35 if PP areas excluded)	5.85 ± 0.90 (6.17 ± 1.01 if PP areas excluded)
Forest Control Plots and Site-Vegetation Type (2025 data)				
FMP091 – ST/19JSd	6.09 ± 0.06	0.19 ± 0.01	42.48 ± 1.31	4.34 ± 0.52
FMP108 – H/19JPs	15.61 ± 0.09	0.38 ± 0.02	22.26 ± 0.59	0.31 ± 0.04
FMP110 – P/19JLc	13.53 ± 0.07	0.04 ± 0.001	11.51 ± 0.41	0.31 ± 0.03
FMP112 – ST/19JSd	7.19 ± 0.06	0.10 ± 0.005	14.55 ± 0.38	0.16 ± 0.02
FMP114 – S/19JBg	13.51 ± 0.06	0.29 ± 0.01	31.61 ± 1.10	2.84 ± 0.24
MMP08A-V2 – P/19JLc	15.01 ± 0.11	0.09 ± 0.003	9.76 ± 0.28	0.67 ± 0.04
QMP01 – P/19JLc	9.96 ± 0.05	0.14 ± 0.005	21.17 ± 0.42	1.73 ± 0.23
QMP02 – H1/19jPS1	15.01± 0.07	0.09 ± 0.003	17.08 ± 0.42	0.19 ± 0.02
Overall Mean	11.99 ± 0.42	0.16 ± 0.04	21.30 ± 1.58	1.32 ± 0.42

In 2024, the dominant native species in the 2023 rehabilitation areas include *Eucalyptus marginata, Acacia celastrifolia, Bossiaea ornata, Petrophile heterophylla, Gastrolobium bilobum, Acacia pulchella, Acacia drummondii* subsp*. candolleana, Acacia lateriticola, Trymalium ledifolium, Bossiaea eriocarpa, Kennedia prostrata, Kennedia coccinea, Acacia drummondii* subsp*. drummondii, Banksia squarrosa* and *Hypocalymma angustifolium*. The most abundant introduced species were **Hypochaeris glabra*, **Ursinia anthemoides, *Vulpia myuros, *Aira caryophyllea, *Lysmachia arvensis* and **Arctotheca calendula;* all of which were recorded in higher abundance in the younger rehabilitation areas. The majority of the introduced species are in very low abundance in the forest areas around Boddington. In the older rehabilitation areas the introduced species tend to reduce in abundance as the native species establish and proliferate in the first 5 to 10 years.

Fifteen-month monitoring of rehabilitation (formerly undertaken at nine months) assessed 38 plots in State Forest and 1 in private property areas. Where applicable, rehabilitation areas met Key Performance Indicators (KPIs) for the categories (Table 3).

Trees and Understorey KPIs

For trees, mean tree density did satisfy the KPI of 500-700 trees/hectare, Table 3. For understorey, mean legume and non-legume densities in State Forest areas was above the KPI. *Banksia grandis* and *Macrozamia riedlei* densities were minimal for both areas of rehabilitation. The density of introduced species was similar to that of the legumes and non-legumes combined within the State Forest. Most of the introduced species recorded were annuals and therefore this figure regularly reduces over time.

Table 3: Summary of mean tree and understorey (annual and perennial) density within 2024 Rehabilitation areas at 15 months against set Key Performance Indicators (KPIs)
Note: No KPIs for understorey within Private Property (PP) rehabilitation areas.
39 plots in 2024 rehabilitation areas in Forest areas.

State Forest					
Trees	**Mean Density (Trees per ha ± s.e.)**			**KPI (Trees per ha)**	**Indicator Met**
Total Seedlings	675	±	130.3	500 – 700	Yes
Eucalypts Only	600	±	121.4	500 – 700	Yes
Understorey	**Mean Density (Plants per m² ± s.e.)**			**KPI (Plants per m²)**	**Indicator Met**
Legumes	3.03	±	0.07	1	Yes
Non-legumes	3.53	±	0.13	1	Yes
Total*	6.56	±	0.14	3	Yes
Banksia grandis	0.05	±	0.01	-	-
Macrozamia riedlei	0.002	±	<0.001	-	-
Introduced species	0.83		0.07	-	-

Eucalypt species = *E. accedens*, *E. marginata*, *E. patens*, *E. rudis*, *E. wandoo* and *Corymbia calophylla.*
* Native species only

Trees

A summary of the results are set out in Table 4, presenting measured parameters with and without the inclusion of *Allocasuarina huegeliana, Banksia grandis* and *Persoonia longifolia*.

Table 4: Summary of tree data (including seedlings) in mine-pit Rehabilitation areas aged 1, 5, 10, 20 and 30 years monitored in September/November 2025 at Boddington Bauxite Mine

	Rehabilitation Age (year rehabilitated)				
	1 year (2024)	**5 years (2020)**	**10 years (2015)**	**20 years (2005)**	**30 years (1995)**
Mean Total Alive (trees/ha)	1273.7 ± 97.7	241.7 ± 15.1	491.7 ± 21.4	679.2 ± 92.6	779.2 ± 146.6
	1829.2 ± 77.7	387.5 ± 24.0	700.0 ± 21.9	775.0 ± 82.0	845.8 ± 184.1
Mean no. Seedlings (<130 cm height; trees/ha)	1273.7 ± 97.7	695.8 ± 119.3	41.7 ± 11.4	25.0 ± 7.7	29.2 ± 29.2
	1829.2 ± 77.7	845.8 ± 85.2	45.8 ± 10.5	29.2 ± 9.8	29.2 ± 29.2
Mean Total Dead (trees/ha)	0.0 ± 0.0	0.7 ± 0.02	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0
	0.0 ± 0.0	2.0 ± 0.04	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0
Mean Tree Height Alive (≥130 cm height; cm/stem)	22.9 ± 0.4	303.2 ± 12.5	503.8 ± 81.6	627.2 ± 17.7	848.2 ± 28.2
	15.3 ± 0.3	284.0 ± 9.4	386.6 ± 81.6	603.7 ± 16.8	810.9 ± 27.5
Seedling Height Alive (<130 cm height; trees/ha)	22.9 ± 0.4	106.7 ± 6.7	109.0 ± 21.9	233.3 ± 30.7	170.7 ± 16.2
	15.3 ± 0.3	112.8 ± 6.3	117.3 ± 21.5	228.6 ± 26.4	217.3 ± 9.7
Mean Tree DBH Alive (cm/stem)	0.0 ± 0.0	4.5 ± 0.2	9.1 ± 0.5	12.4 ± 0.4	16.0 ± 0.6
	0.0 ± 0.0	4.5 ± 0.2	8.2 ± 0.4	11.8 ± 0.4	15.0 ± 0.6
Mean No. of Tree stems Alive (Stems/ tree)	1.0 ± 0.0	1.2 ± 0.04	1.3 ± 0.04	1.3 ± 0.05	2.0 ± 0.1
	1.0 ± 0.0	1.2 ± 0.0	1.3 ± 0.0	1.5 ± 0.1	1.9 ± 0.1

Note: Top line of data for each parameter excludes *Allocasuarina huegeliana* and *Banksia grandis;* bottom line is inclusive of these two species.

Overall, rehabilitation from each age group (30, 20, 10 and 5 years) largely satisfied minimum standards as outlined in the draft completion criteria. The only variation to the later was the need to include the standard error in the overall results for *Corymbia calophylla* and *Eucalyptus marginata* to enable the change from Fail to Pass for these two tree species. According to draft completion criteria guidelines if a rehabilitation year has failed to meet minimum tree per ha density requirements, it must undergo an assessment of richness. One of the rehabilitation areas failed to satisfy minimum standards for total trees. If only *Corymbia calophylla*, Eucalypt species and *Allocasuarina fraseriana* are included in Timber Production values then all plots except two plots in 2020 passed the criteria. If the trees only include *Corymbia calophylla* and *Eucalyptus marginata* then one plot in the 1995 areas, two plots ion the 2015 areas and four plots in the 2020 areas failed the criteria.

During the 2025 assessment, the 2025 rehabilitation (15-month monitoring) was assessed against mean tree density Key Performance Indicators (KPIs). A mean density of 1829.2 trees/ha for all tree species was too high to satisfy KPIs, and according to draft completion criteria guidelines, thinning may be required to reduce total tree numbers in some areas.

Of the different ages of rehabilitation monitored this year, the tree numbers exceeded the natural mining area density (330 trees/ ha), Worsley Alumina Pty Ltd 1985 (Phase Two studies). Trends observed across all years and rehabilitation monitoring times include; an increase in tree density coinciding with a decrease in seedling density, an increase in tree mortality rate and a decline in tree health as the rehabilitation areas age. This indicates that many seedlings are reaching maturity over time and developing into trees, further increasing tree density. However, seedling density values fluctuate over any given period of time, which is indicative of their sensitivity to environmental conditions and competition.

The mean number of stems per tree recorded within the rehabilitation areas reflected differences between tree species, with *Eucalyptus marginata, Eucalyptus patens* and *Eucalyptus wandoo* having higher mean stem numbers than the other Eucalypt species, *Banksia grandis* and the *Allocasuarina* species. The mean number of stems was higher in the older rehabilitation areas.

The bark depth was not recorded on the trees in the older rehabilitation areas as the bark depth was still limited in depth in the older 1995 areas. The proposal to include bark depth in recent draft criteria may need review.

Mean bole heights for trees recorded within the 1995, 2005, 2015 and 2020 rehabilitation areas. Mean bole height varied greatly between tree species and individuals. The results for some of the bole heights on older rehabilitation areas are similar to the boles on the trees in the forest control plots. The bole heights for the trees in the older rehabilitation areas were generally higher.

The annual mean height growth rates for rehabilitation areas monitored at BBM in 2025 were generally positive, except for the *Allocasuarina* sp. which at the time was not allocated to the specific species. The greatest height growth rate recorded for a species was Banksia grandis (36.42cm/year) within 10 years and Eucalyptus marginata (30.32cm/year) within 30 years.

The annual DBH growth rates were assessed over the 30 years, 20 years and 10 years in 1995 rehabilitation areas. The greatest DBH growth rate for an individual species was *Banksia grandis in 10 years* (0.63cm/year) and *Banksia grandis* in 30 years (0.56cm/year). The lowest growth rates were associated with the *Allocasuarina* species.

Similar to previous monitoring, the 2025 monitoring measured an accelerated decline in tree health. The increase in rate of stress could possibly be explained by the relatively dry winters which have occurred within the area over the last twenty years when compared to long term averages (Bureau of Meteorology 2026). These results reinforce the need for on-going monitoring of the rehabilitation areas so that trends relating to density and health can be observed. It must also be noted that the subjective nature of health assessment may also affect results.

1. INTRODUCTION

1.1. Location and Scope of Project

The 2025 spring rehabilitation monitoring assessment forms part of South32 Worsley Alumina Pty Ltd.'s ongoing biological monitoring program in areas cleared, mined and subsequently rehabilitated by project operations. As part of this program Mattiske Consulting Pty Ltd (Mattiske) was commissioned to assess the establishment and progress of flora species in areas rehabilitated during the 1995, 2005, 2015, 2020 and 2024 bauxite mine-pit rehabilitation program and to monitor 8 forest plots in Mt Saddleback (5 plots), in Quindanning (2 plots) and Marradong (1 plot).

1.2. Environmental Legislation and Guidelines

The following key Commonwealth (federal) legislation relevant to this survey is the:

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The following key Western Australian (state) legislation relevant to this survey include the:

- *Biodiversity Conservation Act 2016* (BC Act);
- *Biosecurity and Agriculture Management Act 2007* (BAM Act); and
- *Environmental Protection Act 1986* (EP Act).

Furthermore, key Western Australian guidelines relevant to this survey are the:

- *Environmental Factor Guideline: Flora and Vegetation* (Environmental Protection Authority [EPA] 2016a); and
- *Technical Guidance – Flora and vegetation surveys for environmental impact assessment* (EPA 2016b).

Definitions of flora and vegetation terminology commonly used throughout this report are provided in Appendices A1-A4.

2. BACKGROUND

2.1. Climate

Havel (1975a) characterised the climate of the Northern Jarrah Forest as typically Mediterranean with a predominance of winter rainfall. Beard (1990) subsequently described the climate of the Dale Botanical Subdistrict (within the Northern Jarrah Forest subregion) as somewhat drier than the Southern Jarrah Forest which has an average rainfall of 600 – 1200 mm per annum. The average minimum and maximum temperatures for Wandering for September to December in recent years were slightly variable when compared with the long-term average (LTA) minima and maxima (Figure 1a). The other trend appears to relate to the slightly higher temperatures in the summer months, Figure 1a.

The main trends in 2025 when compared with 2023 and 2024 was a higher rainfall in August prior to monitoring in the spring months of 2025. This resulted in a slight increase in the rainfall in the 3 months prior to the spring assessments when compared with long-term averages for this 3-month period. The summer and autumn months in 2025 were drier in 2025 may be critical for the seedlings in the early establishment periods. Total rainfall recorded for Bannister for the year 2023 was 458.4mm, for 2024 was 570.2mm and for 2025 was 540.3mm which indicates that the rainfall recordings in 2023, 2024 and 2025 were lower than the long-term average of 643.2mm at the Banister Marradong station (Bureau of Meteorology 2026), Figure 1b. The longer term decline is also evident in Figure 1b.

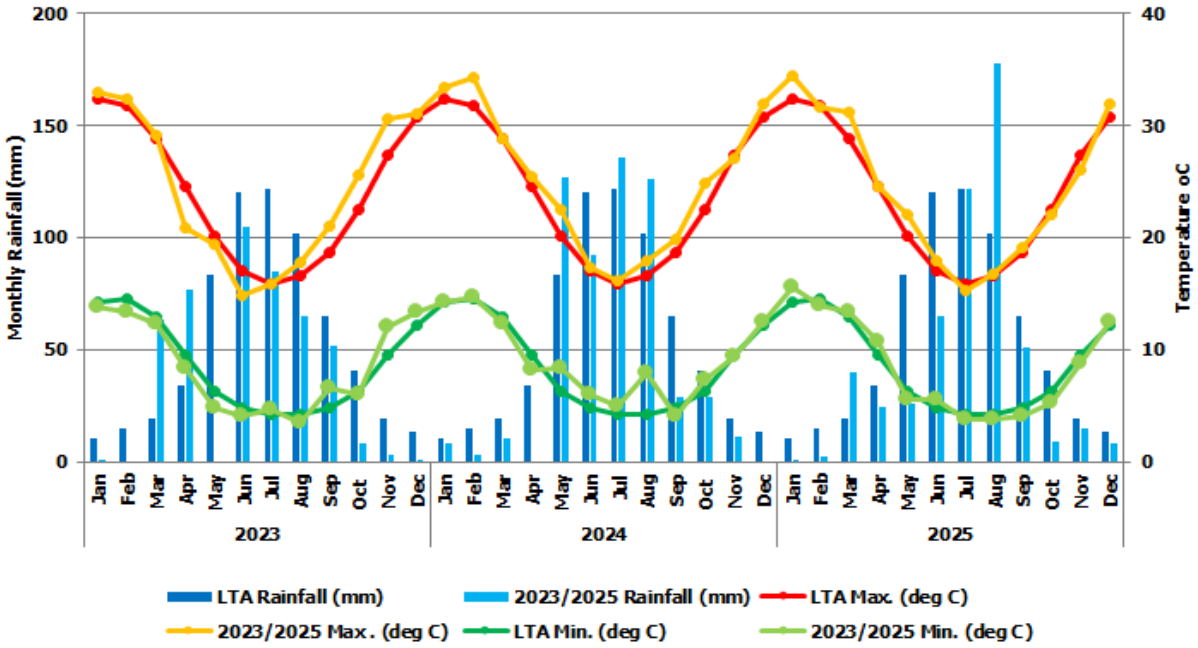


Figure 1a: Rainfall and temperature data for the Bannister and Wandering weather stations

Note: Long term average (LTA) rainfall (Bannister) and temperature (Wandering) data, together with monthly rainfall and average maximum and minimum temperature data for the period January 2023 to October December 2025 are shown (Bureau of Meteorology 2026).

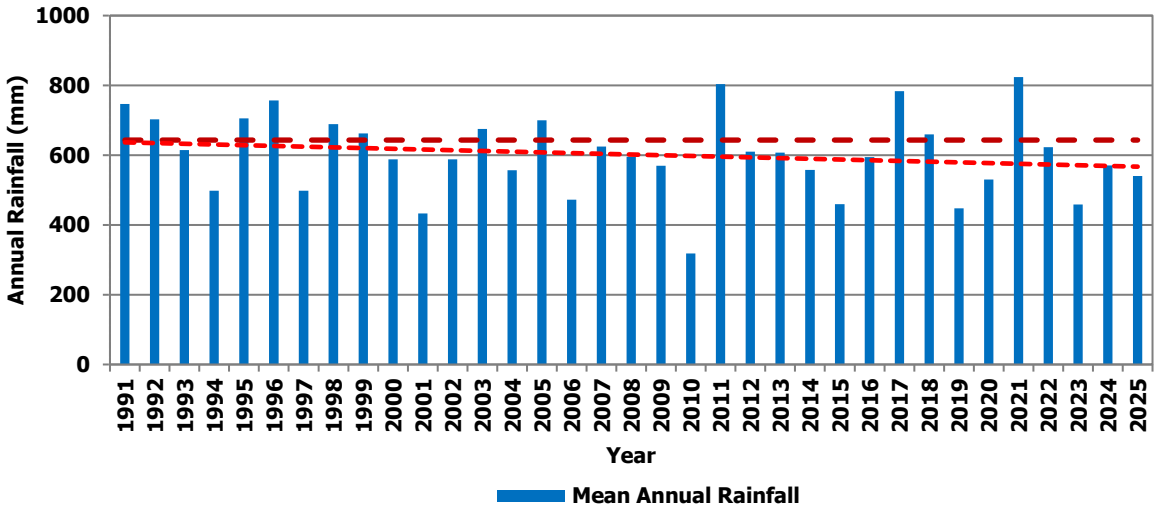


Figure 1b: Long Term Rainfall trends at Bannister (1991 to 2025) weather station

2.2. Geology, Soils and Topography

The soils of the Dale Botanical Subdistrict can be broadly defined as lateritic gravels consisting of up to 5 m or more of ironstone gravels in a yellow, sandy matrix. Related to these are the lateritic podzolic soils with ironstone gravels in a sandy surface horizon, overlying a mottled yellow-brown clay subsoil (Beard 1990). The formation of these soils can be attributed to in situ weathering of igneous rock which underlies much of the Darling plateau (Vlahos et al. 1999). The region overlies an ancient plateau landform and has an average elevation of 300 m which is broken sporadically by nonconforming monadnocks such as Mt Cooke, Mt Dale and Mt Saddleback which reach up to 582 m (Havel 1975a; Beard 1990).

The lateritic soils which are specifically targeted in bauxite mining can be traced to iron-rich, greenstone volcanic "parent" rocks which represent an atypical variation of the granite-derived laterite that is commonplace within the region (Ball & Giles 1985).

2.3. Regional Vegetation

The Northern Jarrah Forest, specifically the Dale Botanical Subdistrict, has been extensively described over the past 100 years by several authors (Diels 1906; Speck 1958; Havel 1975a; Beard 1990). Havel (1975a) summarised a number of the major ecological projects undertaken within the area, from Diels's original plant geography work in 1906 through to Kimber's study of the relationship between the root systems of the Jarrah plant and non-seasonal water loss in 1974. Beard (1990) again built on this framework and further defined the vegetation of this region in his botanical survey of Western Australia.

Diels (1906) and Speck (1958) both recognised that the eastern range of the Jarrah forest (in which the BBM is located) contains a comparatively poorer range of species when compared to the western reaches of the forest. This poorer range of species across the eastern range can be related to a decrease in rainfall from west to east. Speck (1958) split the Jarrah forest into two broad vegetation systems; The Darling System and the Bannister System. The Darling System was described as "prime" Jarrah Forest which covers the Darling Scarp and contains youthful streams with an average annual rainfall of over 890 mm. The Bannister System which covers the eastern Jarrah Forest was associated with a mean annual rainfall of 520 – 1000 mm and no youthful streams.

Comparisons between climactic and edaphic factors and their relationships with trees within the region have been made since Lange (1960) attempted to relate these factors to the distribution of tree species within the Narrogin district. Additional work by Churchill (1961; 1968) addressed the influence of climatic conditions on the distribution of species, also undertaken more recently as part of the regional vegetation mapping program for the Regional Forest Agreement by Mattiske and Havel (1998). The latter studies relied on the conceptual climatic zoning developed by Gentilli for the Jarrah Forest areas (Gentilli 1989).

Beard (1990) described the Jarrah Forest as one of only two forest formations in Western Australia. As would be expected, Jarrah (*Eucalyptus marginata*) is the dominant tree species within this area and is commonly found in association with Marri (*Corymbia calophylla*) in varying proportions. Maximum forest heights range from less than 25 m in the eastern range of Jarrah Forest to heights of greater than 30 m in the western range (Havel 1975a). Beard (1990), as well as other researchers noticed that with the exception of creeklines and areas with significantly higher/lower than average rainfall amounts, no other tree species enters the canopy of the forest. Several smaller tree species (10 – 15 m tall) occur in the forest, including Bull Banksia (*Banksia grandis*), Sheoak (*Allocasuarina fraseriana*) and Snottygobble (*Persoonia longifolia*).

The forest understorey comprises of a variety of shrub species which range from 1 – 2 m in height and have an average density of 185 plants/ha. Commonly occurring species include; *Adenanthos barbiger, Grevillea wilsonii, Trymalium ledifolium, Xanthorrhoea preissii, Macrozamia riedlei* and *Hypocalymma angustifolium*. Beard (1990) described the eastern range of the Jarrah Forest as being typically lower and more open woodland, with *Allocasuarina huegeliana* and *Acacia acuminata* occurring amongst the tree species. An association between tree species and the 500 mm isohyet line was also made obvious in this study with Beard noting the absence of Jarrah and the presence of Powderbark Wandoo (*Eucalyptus accedens*) east of this line. Understorey species also vary in these areas with *Gastrolobium spinosum, Calothamnus quadrifidus* and *Leptospermum erubescens* becoming more common.

Species which occur within the northern Jarrah forest were analysed in Havel (1975a; 1975b) where several indicator species were associated with overstorey complexes that subsequently led to a list of 21 site-types which occur within the Jarrah forest being produced.

The vegetation occurring within the South32 Worsley Alumina Pty Ltd tenements have been described in great detail within Worsley Alumina Pty Ltd (1985) and more recently Mattiske Consulting Pty Ltd (2020). The mining area of Mt Saddleback and the adjacent Marradong area fall into seven vegetation complexes as defined by Mattiske and Havel (1998). A range of site-vegetation types have been defined and mapped by Mattiske for South32 Worsley Alumina Pty Ltd (Mattiske Consulting Pty Ltd 2020). These site-vegetation types as mapped have been based on the site-vegetation types as defined by Havel (1975a and 1975b); although variants have been defined and mapped by Mattiske within the Boddington areas. The majority of the species which occur within the mining areas fall into the Proteaceae, Fabaceae, Myrtaceae and Asteraceae families (Worsley Alumina Pty Ltd 1985). With specific reference to trees, the land on which the mining areas are located should have a stand density of approximately 300 trees/ha (which increases to 500 – 600 trees/ha if seedlings are included).

2.4. Mine-Pit Rehabilitation

The rehabilitation program employed by South32 Worsley Alumina Pty Ltd has undergone several changes since being first developed in 1984 by both the company and the former Forests Department. The main procedures however, have remained relatively true since the inception of the program. After the mining process, areas which have been mined are ripped to a depth of 1.5 m to mitigate clay compaction. Topsoil and gravel are then returned to the area, faunal habitats are constructed to encourage the return of native animals and the ground is then ripped on contour to a depth of 30 – 40 cm (Vlahos *et al.* 1999). The area is then broadcast with a seed mix and supplemented with superphosphate fertiliser to encourage growth and return nutrients to the soil. Plant species which have either exhibited a poor emergence rate from broadcast seed, or do not produce seed (recalcitrant species) are planted as seedlings grown from tissue culture and a variety of other methods.

2.4.1 1995 Rehabilitation Areas

Worsley rehabilitated 81.1ha of mined land during 1995. The following five tree and understorey plots were monitored:

- FAW - MP09;
- N10(A) - MP03;
- NE02 - MP07;
- NE05 - MP08;
- SE02 - MP10;
- SE02 - MP11.

2.4.2 2005 Rehabilitation Areas

Worsley rehabilitated 122.3 ha of mined land during 2005. The following six tree and understorey plots were monitored:

- N10.6 - MP02;
- N18 - MP06;
- NSS - MP01;
- SE11 - MP15;
- SE13 - MP02;
- SW1 - MP10.

2.4.3 2015 Rehabilitation Areas

Worsley rehabilitated 191.33ha of mined land during 2015. The following six tree and understorey plots were monitored:

- ME03-22 - MP03;
- MN24/10-2 – MP07-02;
- SW21 - MP11;
- SW35 – MP14;
- SW47 – MP15;
- WS08 – MP20.

2.4.4 2020 Rehabilitation Areas

South 32 Worsley Alumina Pty Ltd rehabilitated 116.33 ha of mined land during 2020. The following six tree and understorey plots were monitored:

- ME12 - MP07;
- MNE35 - MP05;
- MS09 - MP15;
- SW107 - MP25;
- WM052 - MP33;
- WM056 - MP28.

2.4.5 2024 Rehabilitation Areas

South 32 Worsley Alumina Pty Ltd rehabilitated 279.64ha of mined land during 2025 (of which 15.45ha was on formerly cleared private lands). The following 39 understorey and tree plots on State Forest areas were monitored in 2025:

- MW40 - MP02;
- NO08 - MP03;
- QU02 - MP04, MP05, MP06, MP07, MP08;
- QU02-S5 - MP09;
- QU03 - MP10, MP11, MP12, MP13, MP14, MP15;
- SE108 - MP16, MP17;
- SW16 - MP18, MP19;
- SW52 - MP20;
- WM048 - MP21;
- WM052-S18 - MP22;
- WM055-S3 - MP23, MP24, MP25;
- WM055-S3-DR - MP26, MP27;
- WM056-S11 - MP28, MP29;
- WM056-S6 - MP30, MP31, MP32, MP33, MP34, MP35, MP36, MP37;
- WS09 - MP38, MP39;
- WS2E - MP40.

2.4.6 Forest Control Plots

The following 8 understorey and tree plots in State Forests were monitored:

- FMP091;
- FMP108;
- FMP110;
- FMP112;
- FMP114;
- QMP01;
- QMP02;
- MMP08A-2.

3. OBJECTIVES

The objective of this survey was to undertake a flora and vegetation assessment of the 1, 5, 10, 20 and 30-year-old rehabilitation areas at the Boddington Bauxite Mine (BBM), including:

- assess understorey development and progression within 1995, 2005, 2015, 2020 and 2024 rehabilitation areas and evaluate if revegetation is consistent with rehabilitation objectives and internal milestones or performance indicators;
- review the conservation status of the vascular plant species recorded by reference to current literature and current listings by the Department of Biodiversity, Conservation and Attractions [DBCA] (2026a) and plant collections held at the Western Australian State Herbarium [WAH] (1998-), and listed by the Department of Climate Change, Energy, the Environment and Water [DCCEEW] (2026) under the *Environment Protection and Biodiversity Conservation Act 1999*;
- provide recommendations to South32 Worsley Alumina Pty Ltd that will assist in maximising species richness and diversity in rehabilitation and maximise the similarity between rehabilitation areas and unmined forest plots;
- establish thirty-nine 20 m x 20 m plots within the 2024 rehabilitation areas, based on a selection of a minimum of one plot per approximately five hectares;

- assess the establishment and development of seedlings within the 2024 mine-pit rehabilitation areas;
- assess development of trees in 1995, 2005, 2015 and 2020 mine-pit rehabilitation areas and evaluate regeneration;
- collect and identify the vascular plant species present in the above-mentioned rehabilitation areas; and
- prepare a report summarising the findings.

4. METHODS

4.1. Field Survey

Understorey

Monitoring is undertaken on a representative subset of older rehabilitation blocks chosen on a rotational basis. The rotation is based on a 1, 5, 10, 20 and 30 year assessment cycle. This allows temporal changes to be assessed over time for selected transects and plots in their respective rehabilitation pits. In total, 63 plots (1260 quadrats) on rehabilitation areas and 8 plots (160 quadrats) on forest control areas) were sampled during the 2025 survey at BBM. All transects and plots consisted of twenty (2 m x 2 m) understorey quadrats. Prior to 1994, quadrats were placed in 5 m intervals along a 100 m transect. In 1994 the transect design was replaced by a 20 m x 20 m monitoring plot, based on the design of Bright (1995).

The field survey was conducted according to standards set out in the *Guidance for the assessment of environmental factors – terrestrial flora and vegetation surveys for environmental impact assessment in Western Australia* (EPA 2004), and the more recent *Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016b). As the former document has been superseded by the latter, future monitoring will be conducted in accordance with the *Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016b).

The data gathered from each understorey quadrat was as follows:

- species (or a collection if unknown);
- number of alive and dead individuals of each species (including only those rooted within the quadrat);
- alive and dead percentage foliage cover of each species (including species rooted outside the quadrat, but with foliage overhanging it); and
- any anecdotal observations.

All plant specimens collected during the field surveys were dried and processed in accordance with the requirements of the WAH. The plant species were identified based on taxonomic literature and through comparison with pressed specimens housed at the WAH. Where appropriate, plant taxonomists with specialist skills were consulted. Nomenclature of the species recorded is in accordance with the WAH (1998-).

Trees

Previously established permanent plots were monitored and 20 m x 20 m monitoring plots within 2024 rehabilitation areas were established. A total of 39 tree plots (20m x 20m) were monitored during the 2025 assessment of the 2024 rehabilitation areas.

The following features were recorded for each individual tree encountered within each monitoring plot:

- tree/seedling species;
- tree/seedling height (cm);
- diameter of each stem at breast height in centimetres (DBH: 130 cm from base of tree);
- number of stems per tree;
- bole height (cm) within rehabilitation areas ≥15 years old;
- condition of each tree/seedling (Healthy, Slightly Stressed, Stressed, Very Stressed, Dead Recent, Dead Moderate or Dead Old); and
- potential cause of any physiological stress (e.g. water stress, *Phytophthora cinnamomi* infection, insect attack, shading by other plants).

The presence of seedlings (defined as individuals below 130 cm in height) and the height and health of each seedling was also recorded. For seedlings, the DBH and number of stems were not recorded.

Alive trees were recorded according to one of four alive health categories:

- Healthy (H) - healthy, green foliage
- Slightly Stressed (SS) - slight discolouration in foliage, majority of foliage healthy
- Stressed (S) - marked foliage discolouration, with some loss of foliage
- Very Stressed (VS) - majority of foliage discoloured, desiccation/loss of foliage occurring

Dead trees were recorded on the basis of one of three broadly approximated time since death health condition categories:

- Dead recent (DR) - any foliage remaining is brown and desiccated, bark still remains
- Dead moderate (DM) - foliage is absent, bark and fine twigs present
- Dead old (DO) - foliage and fine twigs absent, bark may still remain

Within the 2024 rehabilitation areas, due to the similarity of seedlings of *Allocasuarina fraseriana* and *Allocasuarina huegeliana*, these two species were counted as one species (*Allocasuarina* sp.) and the combined data were used in calculating the result. Future monitoring in these rehabilitation pits will allow for differentiation between the two species as they mature and produce characteristic bark and fruits.

4.2. Survey Timing

The assessment of understorey and trees within the rehabilitation areas was undertaken by groups of two experienced ecologists and two ecologists from Mattiske Consulting Pty Ltd over multiple weeks from September 2025 to November 2025. All ecologists held valid collection licences to collect flora for scientific purposes, issued under the BC Act 2016. The field survey was conducted according to methodology outlined in Bright (1995).

4.3. Analysis of Site Data

4.3.1 Understorey

Comparison with historical data considered only rehabilitation plots that were monitored in 2025. Therefore, data analysis requires particular attention to the number of transects/plots representing the overall means for historical data.

Analysis of understorey data provided the following for all plots, for each rehabilitation age for this year's assessment, in addition to all previous assessments for rehabilitation areas and control areas:

- mean alive native species richness (mean number of species/80 m² ± s.e.); and

- mean alive and dead plant density (per m² ± s.e.); and
- mean alive and dead foliage cover (% ± s.e.).

Species richness values were derived when the whole plot was taken into consideration and is given as a total value per plot (80 m^2).

Please note that plots analysed each year are taken from a large selection of established plots and therefore each plot is not surveyed each year. This directly influences the results displayed over time for rehabilitation and control plots. This effect is evident in the changes in species presence over time. The rehabilitation and control plots are representative of several vegetative site types and therefore if a species such as *Eucalyptus wandoo* occurs within a plot of one site type it may not naturally occur in a second plot of a different site type. If the first plot is analysed one year and not in the next it might indicate a drop off in *Eucalyptus wandoo*, which does not reflect actual changes in the rehabilitation over time.

Diversity Indices

Two different indices were used to calculate species diversity for the understorey transects and plots in the rehabilitation areas; Shannon-Wiener and Hierarchical Richness. Introduced species were excluded from the calculations to avoid bias associated with temporal variations in the sampling process.

Shannon-Wiener Diversity Index (H')

This index was used to calculate species diversity for the understorey plots in the rehabilitation areas, and included native annual and perennial species only.

$H` = -\sum p_i \log p_i$ where $p_i = n_i/N$ (from Brower and Zar 1977).

Where:

- pi = the proportion of the total number of individuals occurring in species i;
- ni = the number of individuals of species i; and
- N = the total number of individuals of all species in the population (plot).

The Shannon-Wiener Diversity Index (H') was calculated for both density and foliage cover parameters (for alive plants only).

Hierarchical Richness Index (HRI)

The Hierarchical Diversity Index (HRI), as defined by French (1994), differs from the H' in that HRI takes into account total abundance. The HRI calculated here includes native annual and perennial species only.

$HRI = \Sigma (s_i \times i)$

Where:

s_i = the number of individuals occurring in species i; and
i = the rank of the species (the most abundant was given the lowest rank).

Species Abundance

The relative abundance of species was calculated based on the presence of individual taxa (alive) within quadrats using the count of individual alive plants. Species were assigned an abundance value ranging from 1 – 5 depending on the number of quadrats in which they occurred as a percentage of the total number of quadrats monitored. That is:

Abundance of 5 =present in greater than 30% of quadrats monitored

Abundance of 4 =present in 10.01 – 30% of quadrats monitored

Abundance of 3 =present in 5.01 – 10% of quadrats monitored

Abundance of 2 =present in 1.01 – 5% of quadrats monitored

Abundance of 1 =present in 0 – 1% of quadrats monitored

Species abundance was calculated using the 2025 data for 1995, 2005, 2015, 2020 and 2024 rehabilitation areas.

4.3.2 Litter

The foliage cover of the litter coverage on the respective quadrats is undertaken during the understorey assessment in the 2m x 2m quadrats. The data is then converted to means for the respective plots or transects within the different rehabilitation areas.

4.3.3 Trees

Using the data collected during the 2025 assessment, in addition to historical data from previous monitoring assessments, the following calculations and observations were made for each tree species recorded in each rehabilitation age at each successive assessment:

- alive density;
  - trees (≥ 130 cm in height);
  - seedlings (<130 cm in height);
- proportion of trees exhibiting signs of insect attack;
- mean tree height (cm);
- mean tree DBH (cm) (including only trees ≥ 130 cm in height);
- mean number of stems per tree (including only trees ≥ 130 cm in height);
- mean bole height (cm);
- tree bark depth (mm, using Haglof bark probe) on the older trees in rehabilitation areas; and
- proportion of each health condition category.

Annual growth rates, in terms of both tree height and DBH, were determined for each tree species within all ages of rehabilitation where at least three monitoring assessments have taken place. This was achieved by determining the difference in both the mean height and DBH of trees (≥130 cm in height) between the 2025 assessment and the year of establishment, calculating the average growth per year. Monitoring a series of alternative plots may influence the monitoring capabilities of tree growth rates as not all the same trees have been monitored. This factor should be kept in mind when interpreting the annual growth rates results.

4.3.4 Draft Completion Criteria

Rehabilitation was assessed against minimum standards outlined in Table 5a for flora and vegetation by year of rehabilitation establishment in two categories; Pre 1993 and Post 1993. Early rehabilitation (less than 2 years old) was assessed separately against Key Performance Indicators (KPIs) as outlined in Table 5b.

Table 5a: Summary of the flora and vegetation rehabilitation draft completion criteria (excluding 15 month monitoring) – Successional Establishment (≥2 - <10 years)

Year of Establishment	Criteria	Minimum Requirement
Pre 1993	Sustainable overstorey	≥400 mature trees/ha
	Timber production	≥400 mature *Eucalyptus* species* and *Corymbia calophylla* trees/ha
	Introduced species	No Declared Weeds Average introduced species foliage cover <2%
≥2 - <10 years	Sustainable overstorey	>200 mature trees/ha
	Timber production	>200 mature *Eucalyptus marginata* and *Corymbia calophylla* trees/ha
	Species Richness	≥40% of alive native, annual/perennial, understorey species (excluding trees)/ 80m^2
	Mean Native Foliage Cover	≥40% of alive native, annual/perennial, understorey species (excluding trees) foliage cover/80m^2
	Strata / Community Structure	Species presence in different strata
	Introduced species	No Declared Weeds Average annual/perennial introduced species foliage cover <2%/quadrat
≥10 years	Sustainable overstorey	>200 mature trees/ha
	Timber production	>200 mature *Eucalyptus marginata* and *Corymbia calophylla* trees/ha
	Species Richness	≥40% of alive native, annual/perennial, understorey species (excluding trees)/ 80m^2
	Sustainable understorey	≥35% of alive native, annual/perennial, understorey species (excluding trees) foliage cover/quadrat
	Introduced species	No Declared Weeds Average annual/perennial introduced species foliage cover <2%/80m^2
≥12 years	Sustainable overstorey	>200 mature trees/ha
	Timber production	>200 mature *Eucalyptus marginata* and *Corymbia calophylla* trees/ha
	Species Richness	≥40% of alive native, annual/perennial, understorey species (excluding trees)/ 80m^2
	Sustainable understorey	≥35% of alive native, annual/perennial, understorey species (excluding trees) foliage cover/quadrat
	Introduced species	No Declared Weeds Average annual/perennial introduced species foliage cover <2%/quadrat

* *Eucalyptus* species: *Eucalyptus accedens, E. marginata, E. patens* and *E. wandoo*

Table 5b: Summary of the native flora and vegetation rehabilitation draft completion criteria for 15 month monitoring (≤2 Years) within a pit

Area	Category	Criteria (KPI.)
State Forest	Mean trees (all tree species)	500 – 700 trees/ha
	Mean native legumes/m^2	> 1
	Mean native non-legumes/m^2	> 1
	Mean all native plants/m^2	> 3
	Species Richness	Compared with Reference Ecosystems (FMP's)
	No declared weeds	None
	Mean weed density (plants/m2)	< 5
Private Property	Mean trees (all species)	≥ 400 trees/ha
	Mean legumes/m^2	N/A
	Mean non-legumes/m^2	N/A
	Mean all plants/m^2	N/A

5. RESULTS

5.1 Understorey

5.1.1 Fulfilment of Draft Completion Criteria

1995 Rehabilitation
Overall, areas rehabilitated in 1995 did meet the minimum standard for sustainable understprey based on foliage cover providing the standard error was taken inti consideration (Table 6a). The results on the private property (FAW) reduced the overall results. Three of the plots surveyed in 2025 met the draft completion criteria for sustainable understorey and all six plots supported minimal introduced species foliage cover (Table 6b).

2005 Rehabilitation
Overall, areas rehabilitated in 2005 satisfied the minimum standards for rehabilitation (Table 6a). One of the plots surveyed in 2025 did not meet the draft completion criteria for sustainable understorey and all six plots in the three pits met the draft criteria for introduced species foliage cover (Table 6b).

2015 Rehabilitation
Overall, areas rehabilitated in 2015 satisfied the minimum standards for rehabilitation (Table 6a). All six pits surveyed in 2025 met the draft completion criteria for sustainable understorey and introduced species (Table 6b).

2020 Rehabilitation
Overall, areas rehabilitated in 2020 satisfied the minimum standard for sustainable understorey and the minimum standard for introduced species foliage cover (Table 6a). One pit surveyed in 2025(QU03 did not meet the draft completion criteria for sustainable understorey. All pits surveyed in 2025 met the draft completion criteria for introduced species foliage cover (Table 6b).

2024 Rehabilitation
Overall, areas rehabilitated in State Forest in 2024 satisfied the minimum standard for rehabilitation for all three categories (legumes, non-legumes and total plants, Table 6c). Only one plot failed to meet the >3 native plant density (WM056_S6 MP33) and on plot failed to meet the legume density (QU03 MP13).

Table 6a: Summary of understorey rehabilitation at 30, 20, 10 and 5 years old and at 15 months old assessed against draft completion criteria in 2025

Year of Establishment	Criteria	
	Sustainable understorey	Introduced species
1995	PASS ^	PASS
2005	PASS **	PASS
2015	PASS	PASS
2020	PASS #	PASS
2024	PASS &	PASS

Note: ^ in 1995 areas three pits failed sustainable understorey, and 1995 sustainable understorey overall passed taking in consideration the standard error. One of pits on private property (FAW-MP09)
** in 2005 areas one pit failed sustainable understorey, overall 2005 areas passed
# in 2020 areas one pit only just failed sustainable understorey and 2020 overall passed
& in 2024 areas two pits failed (one in legumes and one in total plants) and 2024 overall passed

Table 6b: Understorey (excluding tree species) rehabilitation at 30, 20, 10 and 5 years old by pit assessed against draft completion criteria in 2025
**** designates pass if SE considered**

Year	Pit	Plot	Sustainable understorey (alive foliage cover %/quad)	Pass	Introduced species (alive foliage cover %/quad)	Pass
1995	FAW (Priv Prop)	MP09	14.74 ± 3.69	No	0.03 ± 0.01	Yes
	N10(A)	MP03	38.27 ± 3.86	Yes	0.00 ± 0.00	Yes
	NE02	MP07	59.95 ± 5.22	Yes	0.00 ± 0.00	Yes
	NE05	MP08	40.51 ± 4.36	Yes	0.005 ± 0.003	Yes
	SE02	MP10	21.50 ± 4.42	No	0.03 ± 0.03	Yes
	SE02	MP11	22.67 ± 3.29	No	0.65 ± 0.51	Yes
	Overall		32.94 ± 3.29	Yes	0.12 ± 0.09	Yes
2005	N10.6	MP02	55.90 ± 6.59	Yes	0.00 ± 0.00	Yes
	N18	MP06	20.06 ± 4.66	No	0.003 ± 0.002	Yes
	NSS	MP01	48.10 ± 6.72	Yes	0.008 ± 0.005	Yes
	SE11	MP15	36.90 ± 6.72	Yes	0.00 ± 0.00	Yes
	SE13	MP12	55.90 ± 6.59	Yes	0.00 ± 0.00	Yes
	SW1	MP10	30.38 ± 3.85	Yes	0.02 ± 0.01	Yes
	Overall		39.88 ± 3.08	Yes	0.005 ± 0.002	Yes
2015	ME03-22	MP03	32.94 ± 4.75	Yes	0.05 ± 0.05	Yes
	MN24/10-2	MP07-02	45.28 ± 5.17	Yes	0.00 ± 0.00	Yes
	SW21	MP11	39.79 ± 4.41	Yes	0.13 ± 0.09	Yes
	SW35	MP14	40.00 ± 4.43	Yes	0.47 ± 0.40	Yes
	SW47	MP15	55.44 ± 4.81	Yes	0.18 ± 0.12	Yes
	WS08	MP20	29.61 ± 5.85	Yes	0.03 ± 0.01	Yes
	Overall		40.51 ± 2.11	Yes	0.14 ± 0.09	Yes
2020	ME12	MP07	21.73 ± 3.10	No	0.01 ± 0.01	Yes
	MNE35	MP05	30.36 ± 6.29	Yes	0.53 ± 0.19	Yes
	MS09	MP15	38.44 ± 3.96	No	0.03 ± 0.03	Yes
	SW107	MP25	68.52 ± 7.07	Yes	0.11 ± 0.07	Yes
	WM052	MP33	30.47 ± 5.00	Yes	0.08 ± 0.04	Yes
	WM056	MP28	36.21 ± 3.84	Yes	0.00 ± 0.00	Yes
	Overall		37.62 ± 3.45	Yes	0.13 ± 0.05	Yes

Table 6c: Rehabilitation (alive/annual/perennial native species, excluding tree species) in 15 months old assessed against KPIs in 2025

Pit	Plot	Legumes Mean Density (Plants/m² ± s.e.)	Non-Legumes Mean Density (Plants/m² ± s.e.)	All Plants Mean Density (Plants/m² ± s.e.)	KPIs (Plants/ m²)	Indicator Met
MW40	MP02	1.76 ± 0.21	5.19 ± 0.79	6.95 ± 0.91	KPI of >1 for Legumes and Non-Legumes and >3 for All plants	N/A
NO08	MP03	2.76 ± 0.25	3.41 ± 0.48	6.18 ± 0.58		Yes/Yes/Yes
QU02	MP04	4.29 ± 0.35	2.19 ± 0.40	6.48 ± 0.62		Yes/Yes/Yes
	MP05	3.69 ± 0.32	1.16 ± 0.19	4.85 ± 0.46		Yes/Yes/Yes
	MP06	3.44 ± 0.41	1.44 ± 0.22	4.88 ± 0.51		Yes/Yes/Yes
	MP07	3.00 ± 0.27	3.38 ± 0.42	6.38 ± 0.48		Yes/Yes/Yes
	MP08	1.95 ± 0.26	3.68 ± 0.62	5.63 ± 0.66		Yes/Yes/Yes
QU02-S5	MP09	4.98 ± 0.50	1.15 ± 0.18	6.13 ± 0.61		Yes/Yes/Yes
QU03	MP10	5.25 ± 0.46	3.45 ± 0.46	8.70 ± 0.73		Yes/Yes/Yes
	MP11	3.28 ± 0.15	2.18 ± 0.27	5.45 ± 0.32		Yes/Yes/Yes
	MP12	4.15 ± 0.30	3.29 ± 0.43	7.44 ± 0.54		Yes/Yes/Yes
	MP13	0.66 ± 0.15	8.78 ± 2.58	9.44 ± 2.58		No/Yes/Yes
	MP14	5.78 ± 0.61	3.41 ± 0.43	9.19 ± 0.91		Yes/Yes/Yes
	MP15	5.04 ± 0.36	1.80 ± 0.19	6.84 ± 0.40		Yes/Yes/Yes
SE108	MP16	5.50 ± 0.65	2.39 ± 0.33	7.89 ± 0.73		Yes/Yes/Yes
	MP17	3.14 ± 0.40	1.41 ± 0.24	4.55 ± 0.53		Yes/Yes/Yes
SW16	MP18	3.30 ± 0.37	2.05 ± 0.28	5.35 ± 0.58		Yes/Yes/Yes
	MP19	4.20 ± 0.34	2.40 ± 0.21	6.60 ± 0.51		Yes/Yes/Yes
SW52	MP20	4.74 ± 0.42	2.36 ± 0.28	7.10 ± 0.65		Yes/Yes/Yes
WM048	MP21	2.91 ± 0.25	2.36 ± 0.20	5.28 ± 0.37		Yes/Yes/Yes
WM052_S 18	MP22	1.86 ± 0.25	1.49 ± 0.16	3.35 ± 0.26		Yes/Yes/Yes
WM055_S 3	MP23	1.46 ± 0.18	5.49 ± 0.68	6.95 ± 0.71		Yes/Yes/Yes
	MP24	2.60 ± 0.38	6.21 ± 0.93	8.81 ± 1.08		Yes/Yes/Yes
	MP25	2.34 ± 0.21	5.50 ± 0.71	7.84 ± 0.76		Yes/Yes/Yes
WM055_S 3DR	MP26	3.76 ± 0.29	2.83 ± 0.61	6.59 ± 0.68		Yes/Yes/Yes
	MP27	2.40 ± 0.20	2.14 ± 0.18	4.54 ± 0.26		Yes/Yes/Yes
WM056_S 11	MP28	3.09 ± 0.41	3.21 ± 0.24	6.30 ± 0.48		Yes/Yes/Yes
	MP29	2.46 ± 0.28	3.06 ± 0.23	5.53 ± 0.38		Yes/Yes/Yes
WM056_S 6	MP30	1.68 ± 0.22	3.89 ± 0.76	5.56 ± 0.76		Yes/Yes/Yes
	MP31	2.15 ± 0.23	6.49 ± 1.05	8.64 ± 1.01		Yes/Yes/Yes
	MP32	1.95 ± 0.27	4.73 ± 0.62	6.68 ± 0.68		Yes/Yes/Yes
	MP33	1.40 ± 0.16	1.15 ± 0.17	2.55 ± 0.27		Yes/Yes/No
	MP34	1.91 ± 0.23	2.88 ± 0.32	4.79 ± 0.37		Yes/Yes/Yes
	MP35	2.33 ± 0.32	4.43 ± 0.65	6.75 ± 0.89		Yes/Yes/Yes
	MP36	2.45 ± 0.35	1.95 ± 0.30	4.40 ± 0.56		Yes/Yes/Yes
	MP37	1.84 ± 0.24	2.96 ± 0.33	4.80 ± 0.38		Yes/Yes/Yes
WS09	MP38	2.58 ± 0.25	9..31 ± 1.07	11.89 ± 1.02		Yes/Yes/Yes
	MP39	2.31 ± 0.30	3.49 ± 0.42	5.80 ± 0.62		Yes/Yes/Yes
WS2E	MP40	3.73 ± 0.45	9.11 ± 1.35	12.84- ± 1.45		Yes/Yes/Yes
Overall (incl. all plots)		**3.03 ± 0.07**	**3.53 ± 0.13**	**6.56 ± 0.14**		Yes/Yes/Yes

5.1.2 1995 Rehabilitation (30 years)

Eight-eight native plant species and twelve introduced plant species were recorded in the spring months of 2025. There was a marked reduction in introduced species as is evident from absence in density and foliage cover results in 2025. The only plot that had a higher range of introduced species was FAW MP09 which occurs on private property. If this plot is excluded in the mean of introduced species the average decreases from 2.50 ± 1.74 to 0.83 ± 0.47.

No threatened flora pursuant to the BC Act 2016 and as listed by the DBCA (2026b), or pursuant to the EPBC Act 1999 and listed by the DCCEEW (2026) were recorded within the 1995 rehabilitation areas.

No Priority flora species were recorded in 2025 on 1995 rehabilitation areas.

Results from the analysis of quadrat data from the 1995 rehabilitation areas are presented in Tables 7a – 7c and Figures 2a – 2h. Within the 1995 rehabilitation areas assessed in 2025, native species richness ranged from 25 – 51 species/80 m² while that for introduced species ranged from 0 to 10 species/80 m² (Table 7a). Overall, the 1994 rehabilitation areas had a mean native species richness of 34.33 ± 3.99 species/80 m² (Table 7a). Mean native species richness within the 1995 rehabilitation areas for the same plots monitored in between 1996 and 2025 shows a consistency in numbers around the 30 to 40 species with a slight decrease in 2025 of native species, Figure 2a.

Table 7a: Summary of mean alive native and introduced species richness (per 80 m²) of 1995 Rehabilitation areas monitored in 2025

1995 Rehabilitation		Species Richness per 80 m²	
Pit	**Plot**	**Native**	**Introduced**
FAW	MP09	28	10
N10(A)	MP03	25	0
NE02	MP07	28	0
NE05	MP08	51	3
SE02	MP10	40	1
SE02	MP11	34	1
Overall Mean		34.33 ± 3.99	2.50 ± 1.74
Overall Mean (excluding FAW MP09 on private property)		35.60 ± 4.63	1.00 ± 0.55

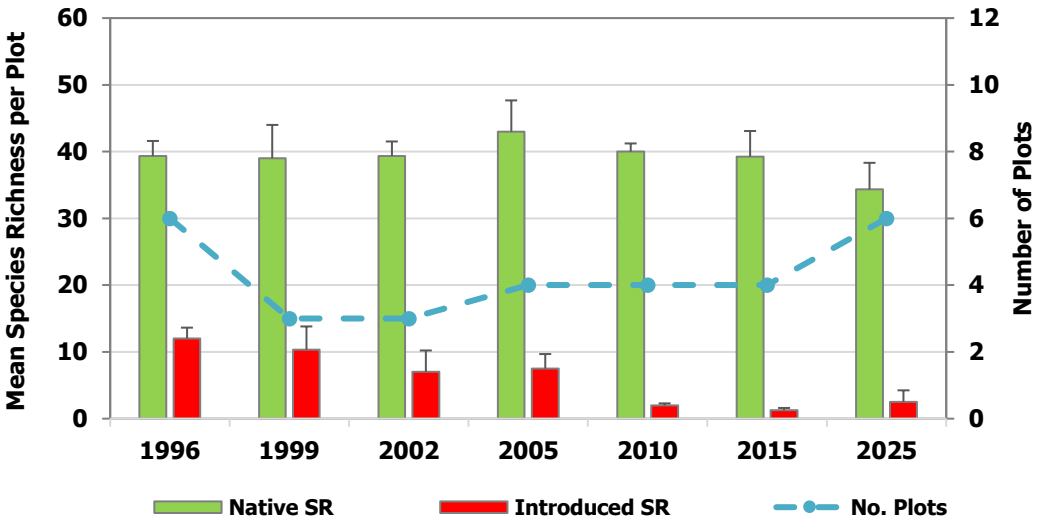


Figure 2a: Mean of all alive native and introduced species richness /80 m² ± s.e. for the 1995 (30 years) rehabilitation areas

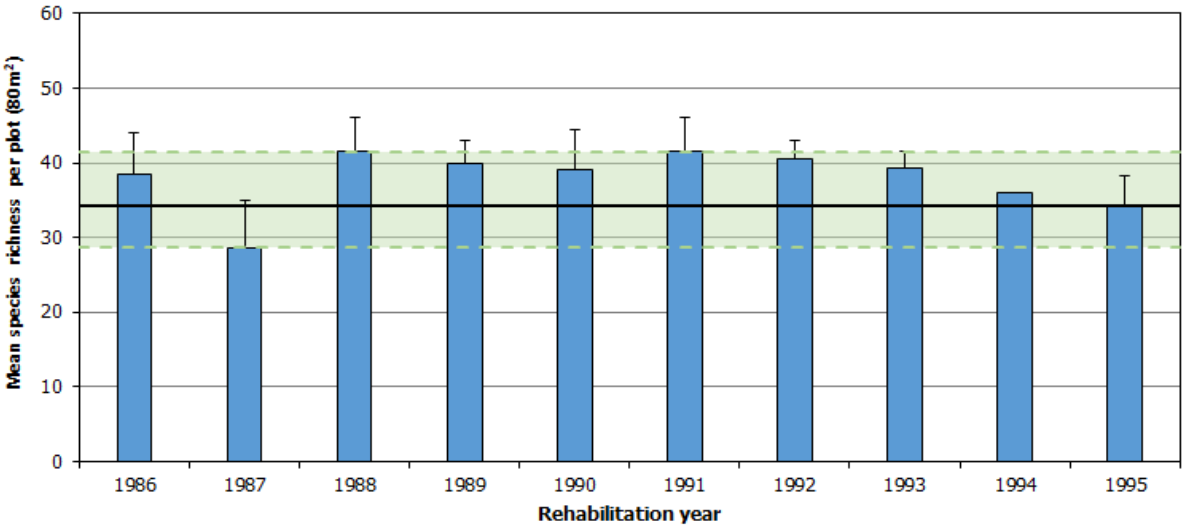


Figure 2b: Mean of alive native species richness /80m² ± s.e. for the 30-year-old rehabilitation areas over time

Note: Green colour bands show the historic range (from minimum to maximum) for 30-year old rehabilitation. The black line indicates the value from the current (2025) assessment.

Table 7b: Summary of mean alive plant density/m² (± s.e.) and mean alive and dead foliage cover (%) of 1995 Rehabilitation areas monitored in 2025

1995 Rehabilitation		Mean Plant Density (plants/m²) ± s.e.				Mean Foliage Cover (%) ± s.e.			
Pit	Plot	Native		Introduced		Native		Introduced	
		Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead
FAW	MP09	2.00 ± 0.29	0.03 ± 0.02	0.94 ± 0.23	1.03 ± 0.54	14.74 ± 3.69	4.26 ± 1.86	0.03 ± 0.01	0.04 ± 0.02
N10(A)	MP03	8.23 ± 0.66	0.16 ± 0.09	0.00 ± 0.00	0.00 ± 0.00	38.27 ± 3.86	0.91 ± 0.26	0.00 ± 0.00	0.00 ± 0.00
NE02	MP07	11.44 ± 0.99	0.84 ± 0.22	0.00 ± 0.00	0.00 ± 0.00	59.95 ± 5.22	2.04 ± 0.50	0.00 ± 0.00	0.00 ± 0.00
NE05	MP08	8.39 ± 0.62	0.46 ± 0.09	0.11 ± 0.08	0.00 ± 0.00	40.51 ± 4.36	1.38 ± 0.38	0.005 ± 0.003	0.00 ± 0.00
SE02	MP10	3.88 ± 0.41	0.68 ± 0.12	0.03 ± 0.03	0.00 ± 0.00	21.50 ± 4.42	14.54 ± 3.45	0.03 ± 0.03	0.00 ± 0.00
SE02	MP11	3.01 ± 0.30	0.76 ± 0.10	0.01 ± 0.01	0.00 ± 0.00	21.50 ± 4.42	12.00 ± 2.29	0.65 ± 0.51	0.00 ± 0.00
Overall Mean (all areas)		6.16 ± 0.39	0.49 ± 0.05	0.55 ± 0.05	0.17 ± 0.09	32.94 ± 2.18	5.85 ± 0.90	0.12 ± 0.09	0.00 ± 0.00
Overall Mean (excluding FAW MP09 on private property)		6.99 ± 0.42	0.58 ± 0.06	0.03 ± 0.02	0.00 ± 0.00	36.58 ± 2.35	6.17 ± 1.01	0.14 ± 0.10	0.00 ± 0.00

In the 1995 rehabilitation plots monitored in 2025, the mean alive native plant density ranged from 2.00 ± 0.29 plants/m² to 11.44 ± 0.99 plants/m² and that of alive introduced plants were below 1.00 plants/m² on all plots in 2025 (Table 7b). The range of alive native species increases if the plot on the private property is excluded in the averages. The mean density of alive plants on the transects as re-monitored

in 2025 illustrated a decrease since 2005. The number of introduced plants in the respective transects decreased over time, Figure 2c.

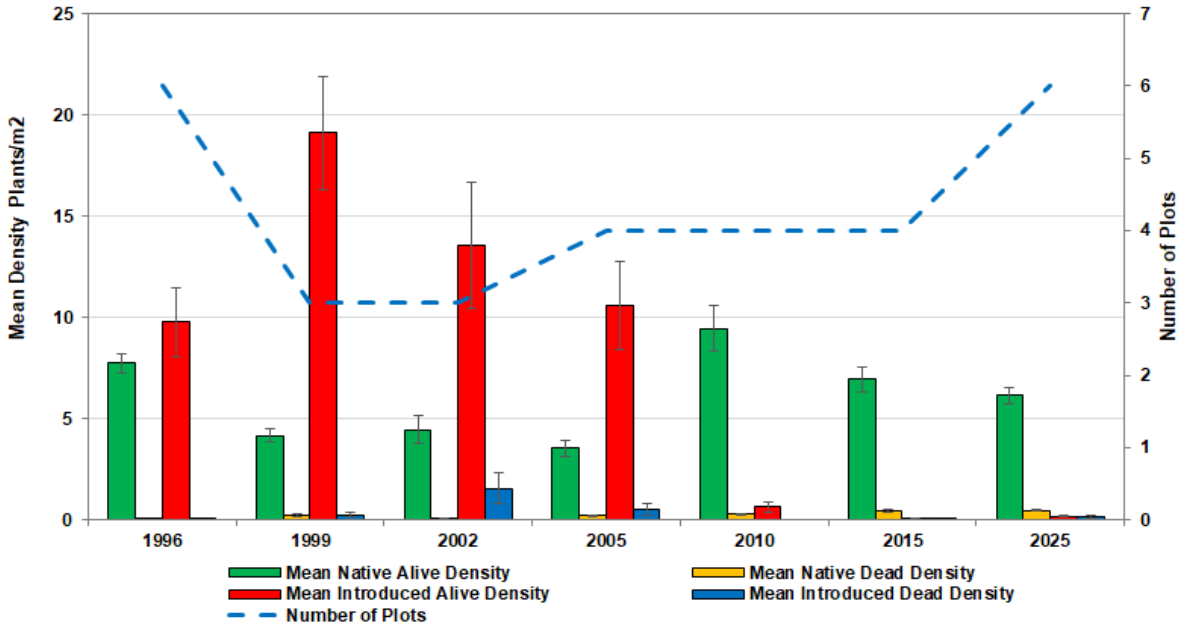


Figure 2c: Mean alive and dead native and introduced plant density (per m² ± s.e.) for the 1995 (30 years) rehabilitation areas (excludes tree species)

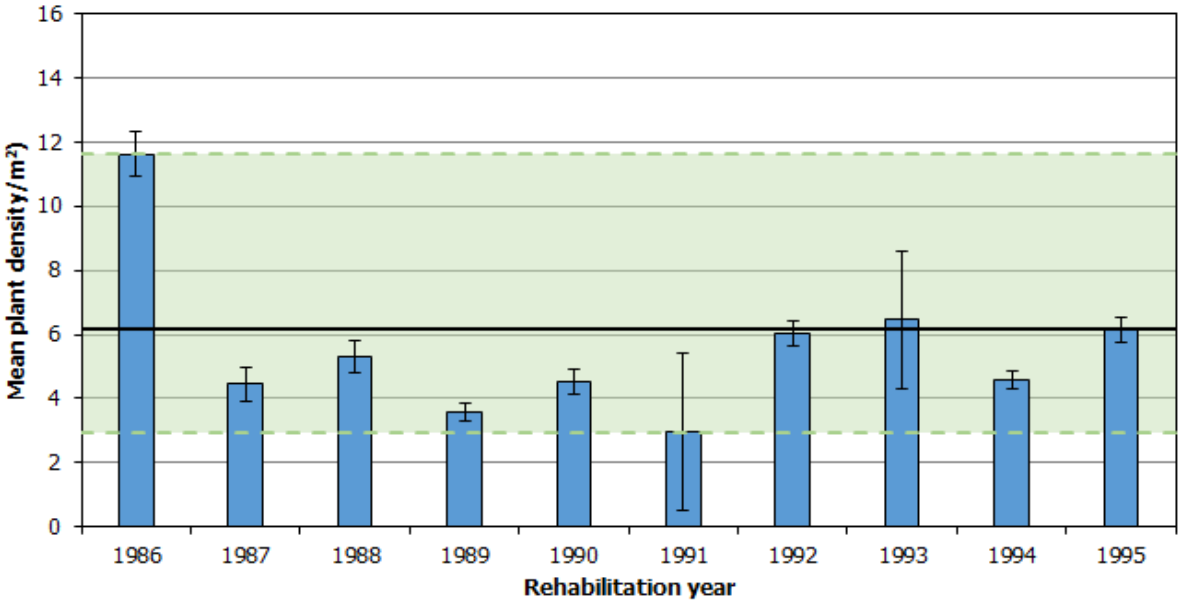


Figure 2d: Mean alive native species density per m² ± s.e. for the 30 years rehabilitation areas over time

Note: Green colour bands show the historic range (from minimum to maximum) for 30-year old rehabilitation. The black line indicates the value from the current (2025) assessment.

Mean alive foliage cover recorded for these areas in 2025 was slightly lower than the previous monitoring in 2015, Figure 2e. Of the six 1995 rehabilitation plots monitored in 2025, plot NE02 MP07 recorded the highest mean alive foliage cover of native species (59.95% ± 5.22) whilst plot FAW MP09 on private property had the lowest (14.74% ± 3.69). Overall, the 1995 rehabilitation areas had a mean alive native foliage cover of 32.94% ± 2.18 and an alive introduced cover of 0.12% ± 0.09 (Table 7b). If FAW MP09 is excluded then the overall mean alive foliage cover increases to 36.58% ± 2.18. Overall, the foliage

cover in 2025 was lower than previous 30-year assessments of the different rehabilitation ages (Figure 2f). The latter may relate to the loss of some of the foliage cover in 2025.

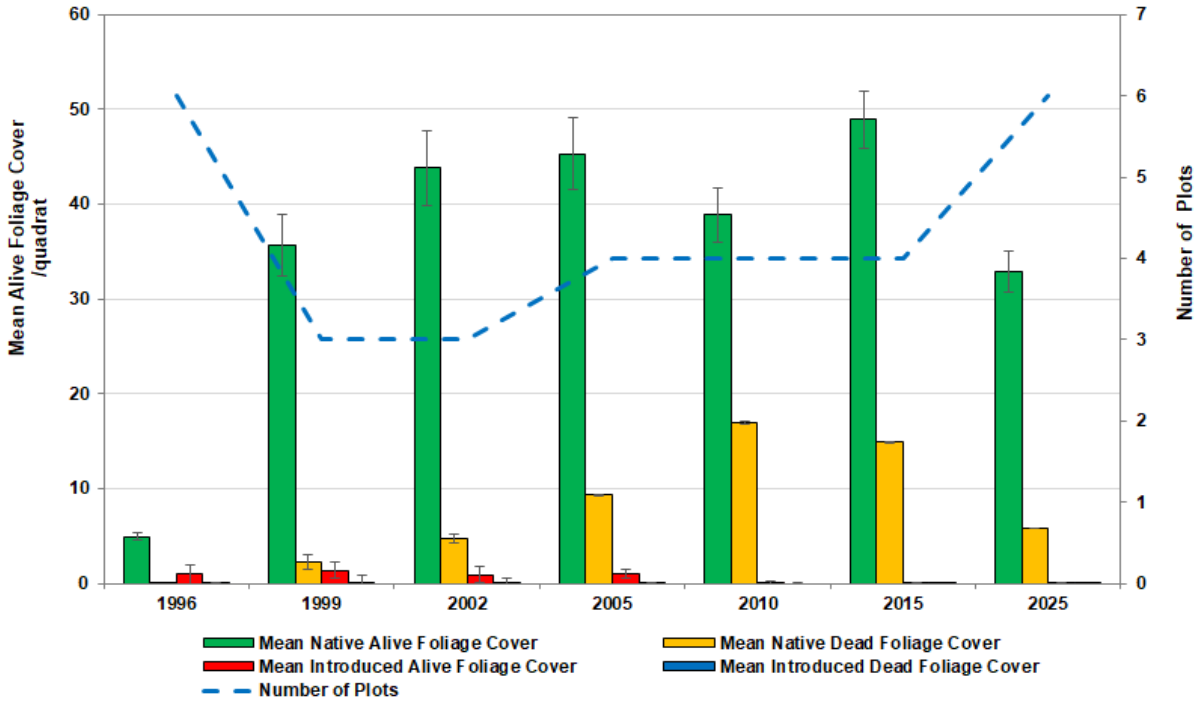


Figure 2e: Mean alive and dead native and introduced foliage cover (% ± s.e.) for the 1995 (30 years) rehabilitation areas; excludes tree species

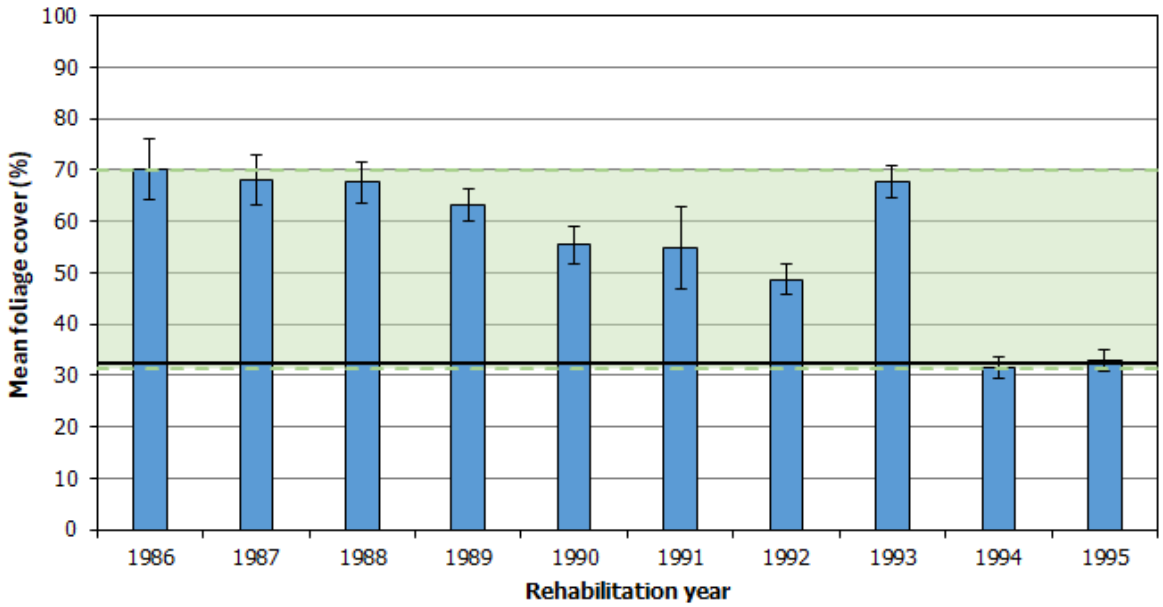


Figure 2f: Mean alive native foliage cover/80 m² ± s.e. for the 30 years rehabilitation areas over time

Note: Green colour bands show the historic range (from minimum to maximum) for 30-year old rehabilitation. The black line indicates the value from the current (2025) assessment.

Both the Shannon-Wiener Diversity indices (H') for density and foliage cover for 1995 rehabilitation areas have been variable between assessments. However, H' for density and cover were slightly lower in 2025 for 1995 areas (Figure 2g).

The Hierarchical Richness Index (HRI) value for the 1995 rehabilitation areas decreased slightly in 2025 from earlier higher recordings in 1996, 2010 and 2015; with the highest in NE02 MP07 in 2025 (Table 7c, Figure 2h).

Table 7c: Summary of Shannon-Wiener Diversity indices (H') for both alive density and cover for alive plants and Hierarchical Richness Index (HRI) values for alive plants in 1995 Rehabilitation areas monitored in 2025

1995 Rehabilitation		H' (native & introduced)						HRI (native)
Pit	Transect	Density			Cover			
FAW	MP09	2.831			1.474			687
N10(A)	MP03	1.774			1.779			3298
NE02	MP07	1.967			1.987			4543
NE05	MP08	2.788			2.375			3187
SE02	MP10	3.15			1.848			1408
SE02	MP11	3.017			1.897			1109
Min - Mean - Max		1.77	2.59	3.02	1.47	1.89	2.38	687 2372 4543

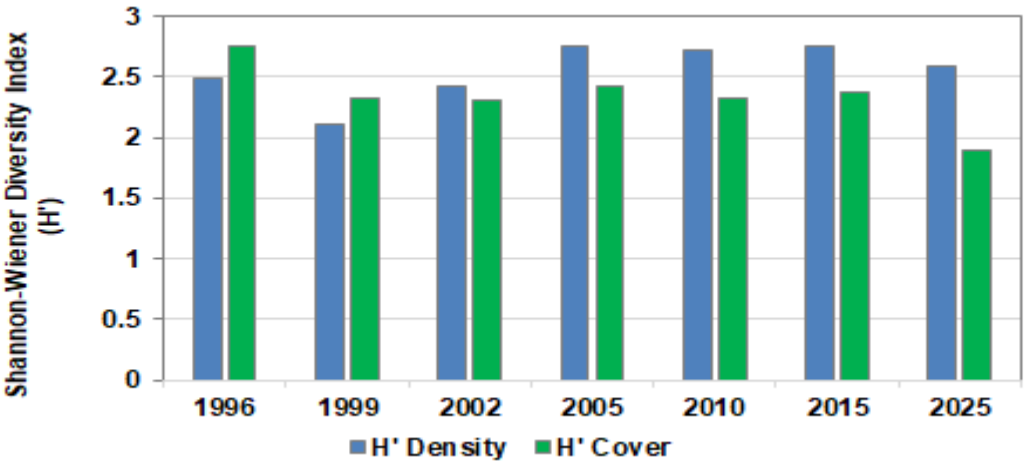


Figure 2g: Mean Shannon-Wiener Diversity indices (H') for alive (combined native and introduced) density and foliage cover for the 1995 rehabilitation areas over time

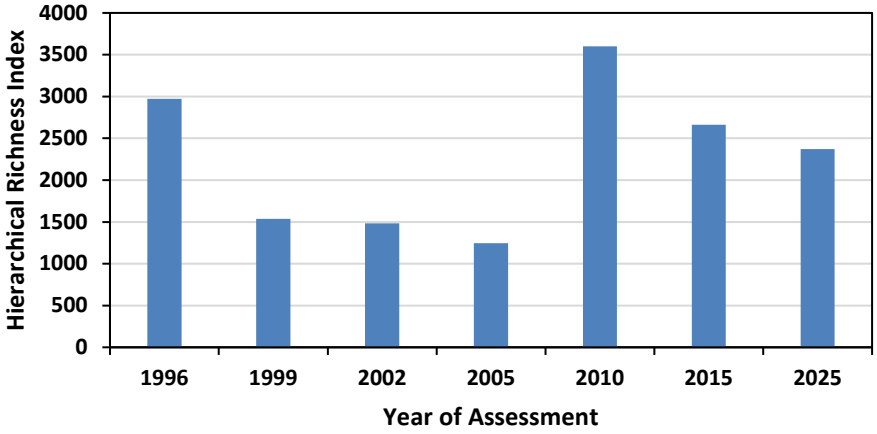


Figure 2h: Hierarchical Richness Index (HRI) for alive native plants in the 1995 rehabilitation areas over time

5.1.3 2005 Rehabilitation (20 years)

One hundred and thirteen native plant species were recorded, and four introduced plant species were recorded in 2025. All introduced species are annual species that establish after seasonal rains.

No threatened flora pursuant to the BC Act 2016 and as listed by the DBCA (2026b), or pursuant to the EPBC Act 1999 and listed by the DCCEEW (2026) were recorded within the 2005 rehabilitation areas.

No Priority flora species were recorded in 2025 on 2005 rehabilitation areas.

Results from the analysis of quadrat data from the 2005 rehabilitation areas are presented in Tables 8a – 8c and Figures 3a – 3h. Within the 2005 rehabilitation areas in the 2025 assessment, native and introduced species richness ranged from 40 – 59 species/80 m² and 0 – 3 species/80 m² respectively, plot SE MP15 recording the highest native species richness of 59 species/80 m². The results for the sampled plots was slightly lower in 2025 than in 2015 (Figure 3a). Overall, the mean native species richness recorded in 2025 for the 2005 rehabilitation areas was 49.50 ± 3.27 species/80 m² (Table 8a). Mean native species richness in these 20-year old plots in 2024 areas was similar to other 20 year old rehabilitation (Figure 3b).

Table 8a: Summary of mean alive native and introduced species richness (per 80 m²) of 2005 Rehabilitation areas monitored in 2025

2005 Rehabilitation		Species Richness per 80 m²	
Pit	**Plot**	**Native**	**Introduced**
NSS	MP01	58	1
N10.6	MP02	40	0
N18	MP06	45	3
SW01	MP10	52	2
SE13	MP12	43	1
SE	MP15	59	1
Overall Mean		49.50 ± 3.27	1.33 ± 0.37

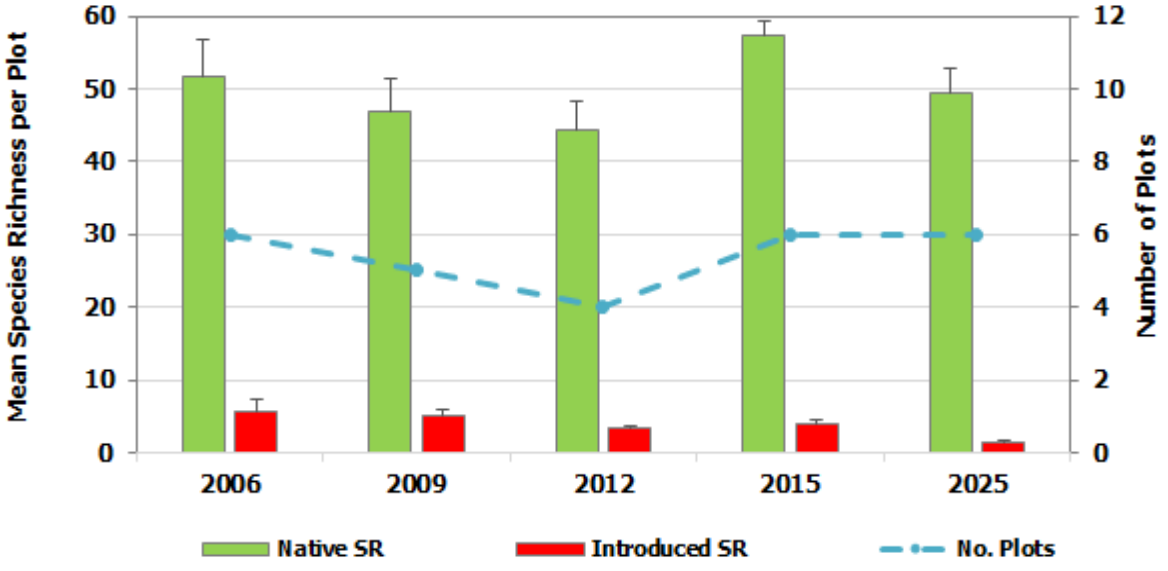


Figure 3a: Mean of alive native and introduced species richness /80 m² ± s.e. for the 2005 (20 years) rehabilitation areas

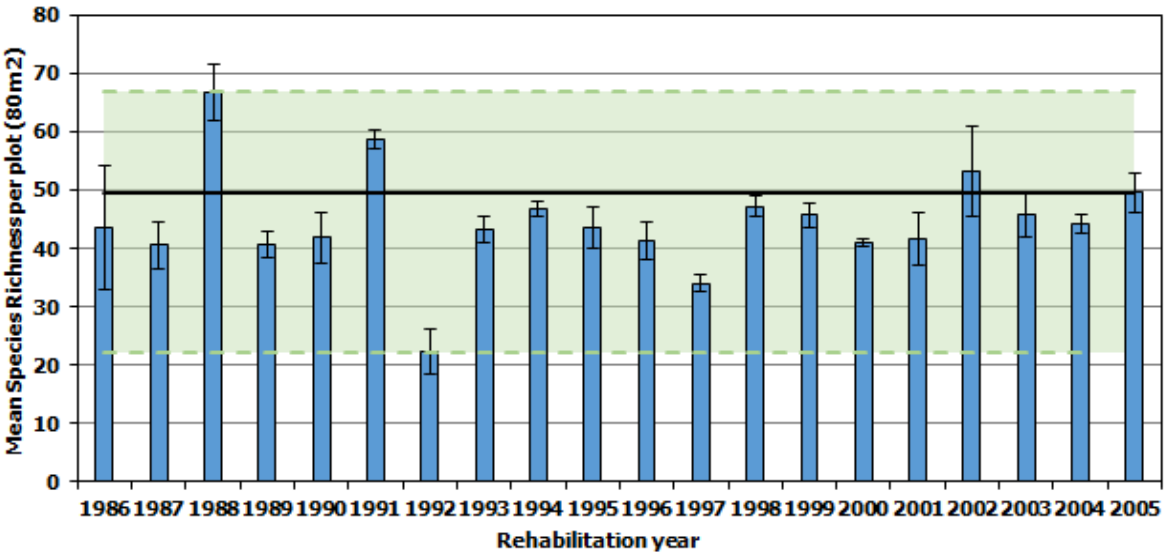


Figure 3b: **Mean alive native species richness (/80 m² ± s.e.) for the current assessment (2025) of 20-year-old rehabilitation (rehabilitation year 2005) and from previous assessments of 20 year-old rehabilitation.**
Note: Green colour bands show the historic range (from minimum to maximum) for 20-year old rehabilitation. The black line indicates the value from the current (2025) assessment.

Table 8b: **Summary of mean alive and dead plant density/m² (± s.e.) and mean alive and dead foliage cover (%) of 2005 Rehabilitation areas monitored in 2025**

2005 Rehabilitation		Mean Plant Density (plants/m²) ± s.e.				Mean Foliage Cover (%) ± s.e.			
Pit	Plot	Native		Introduced		Native		Introduced	
		Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead
NSS	MP01	7.09 ± 0.70	0.39 ± 0.07	0.08 ± 0.05	0.03 ± 0.03	48.10 ± 6.72	18.33 ± 4.21	0.01 ± 0.01	0.001 ± 0.001
N10.6	MP02	6.08 ± 1.63	0.84 ± 0.20	0.00 ± 0.00	0.00 ± 0.00	55.90 ± 6.59	26.64 ± 5.91	0.00 ± 0.00	0.00 ± 0.00
N18	MP06	3.59 ± 0.44	0.34 ± 0.08	0.10 ± 0.07	0.06 ± 0.04	20.06 ± 4.66	9.45 ± 3.87	0.004 ± 0.002	0.002 ± 0.001
SW01	MP10	4.75 ± 0.63	0.63 ± 0.12	0.09 ± 0.05	0.00 ± 0.00	30.38 ± 3.85	15.76 ± 4.15	0.02 ± 0.01	0.00 ± 0.00
SE13	MP12	4.86 ± 0.43	0.74 ± 0.14	0.00 ± 0.00	0.01 ± 0.01	47.94 ± 4.61	11.15 ± 2.37	0.00 ± 0.00	0.005 ± 0.005
SE	MP15	4.35 ± 0.36	0.29 ± 0.13	0.00 ± 0.00	0.06 ± 0.06	36.90 ± 6.72	10.36 ± 3.43	0.00 ± 0.00	0.003 ± 0.003
Overall Mean		5.12 ± 0.49	0.54 ± 0.08	0.04 ± 0.02	0.03 ± 0.02	39.88 ± 3.08	15.28 ± 2.13	0.005 ± 0.002	0.002 ± 0.001

Mean alive plant density of native species was the greatest within plots NSS MP01 (7.09 ± 0.70 plants/m²) and lowest within plot N18 MP06 (3.59 ± 0.44 plants/m²). The overall mean native alive plant density recorded for the areas was 5.12 ± 0.49 plants/m², whilst for mean native dead plant density it was 0.54 ± 0.08 plants/m², Table 8b. When compared with previous assessments of 20-year old rehabilitation, the alive native density results were lower than the peaks of over 10 plants /m² (Figure 3d).

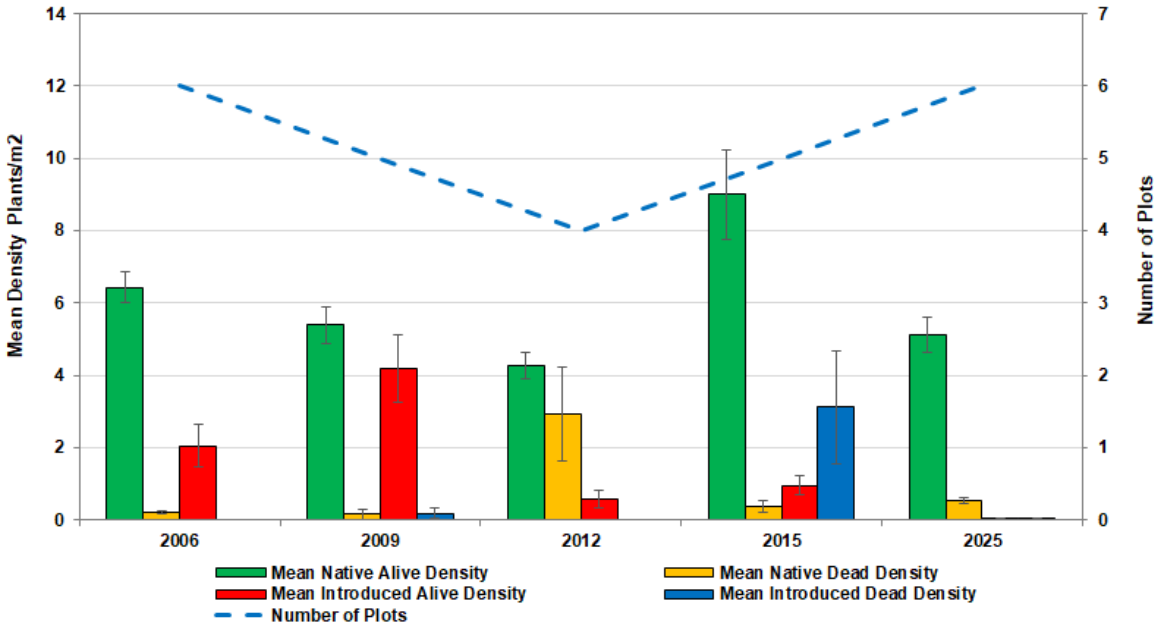


Figure 3c: **Mean alive and dead native and introduced plants per m² ± s.e. for the 2005 (20 years) rehabilitation areas; excludes tree species**

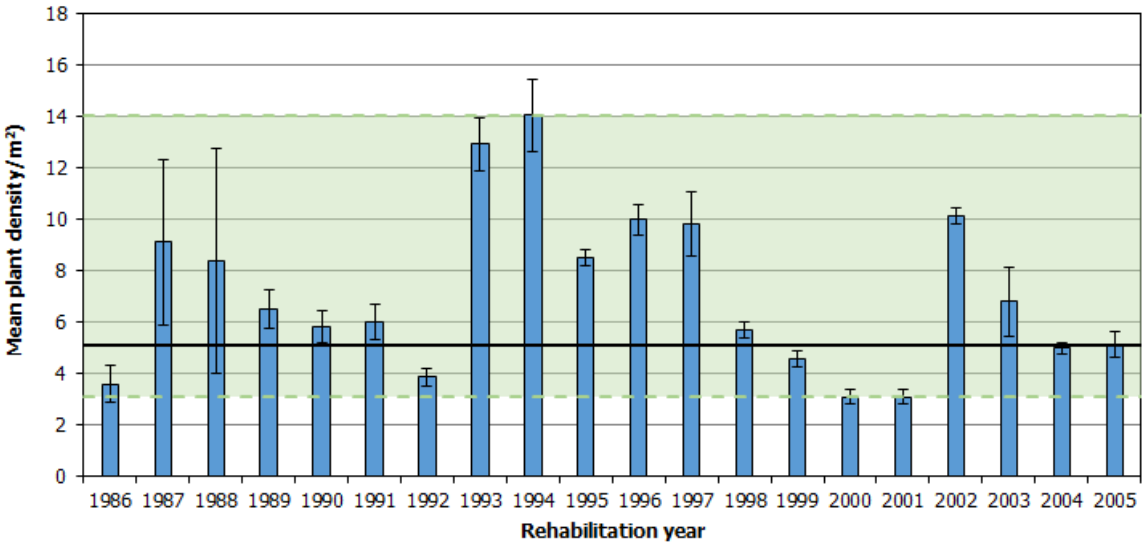


Figure 3d: **Mean alive native plant density (per m² ± s.e.) for the 2005 (20 years) rehabilitation areas over time.** Note: Green colour bands show the historic range (from minimum to maximum) for 20-year old rehabilitation. The black line indicates the value from the current (2025) assessment.

Mean alive foliage cover of native species recorded in 2025 (39.88%) was lower than the recent assessments of 20-year-old areas, Figure 3f. The mean alive foliage cover of introduced species was 0.005%; being consistent with the decline in introduced species in older rehabilitation areas. Mean native alive foliage cover was highest within N10.6 MP02 (55.90% ± 6.59) and was lowest within N18 MP06 (20.06% ± 4.66).

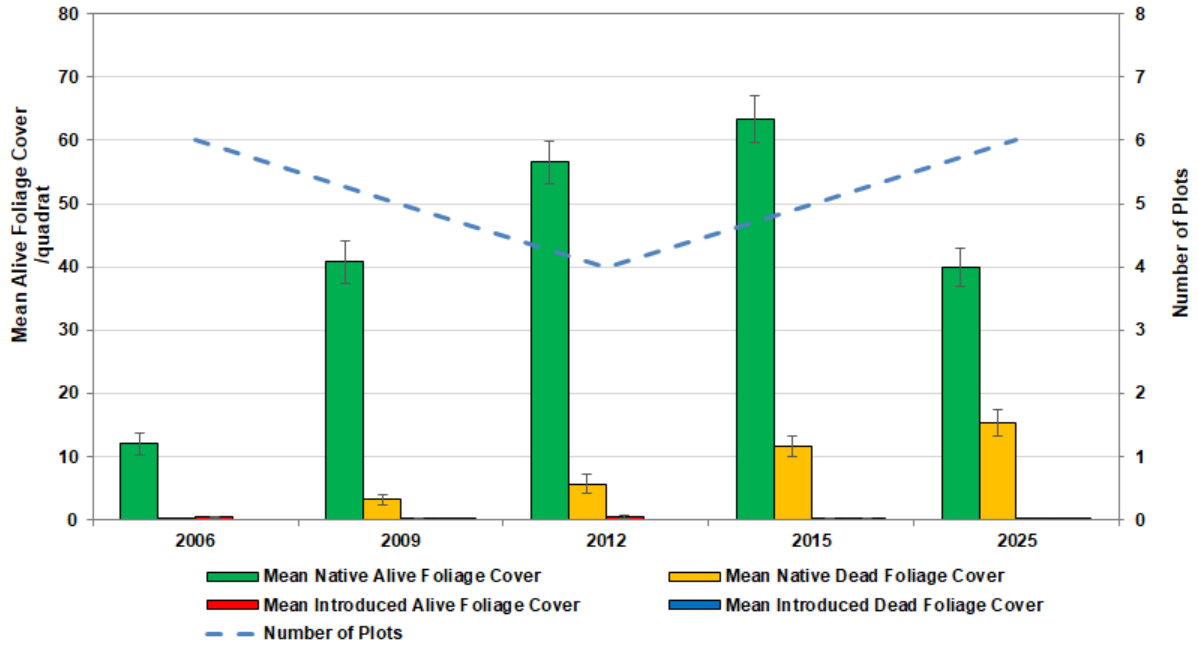


Figure 3e: Mean alive and dead native and introduced foliage cover (% ± s.e.) for the 2005 (20 years) rehabilitation areas; excludes tree species

When compared with previous assessments of 20 year old rehabilitation, the mean alive foliage cover (39.88% ± 3.08) for these areas showed a lower alive foliage cover in other years (Figure 3f).

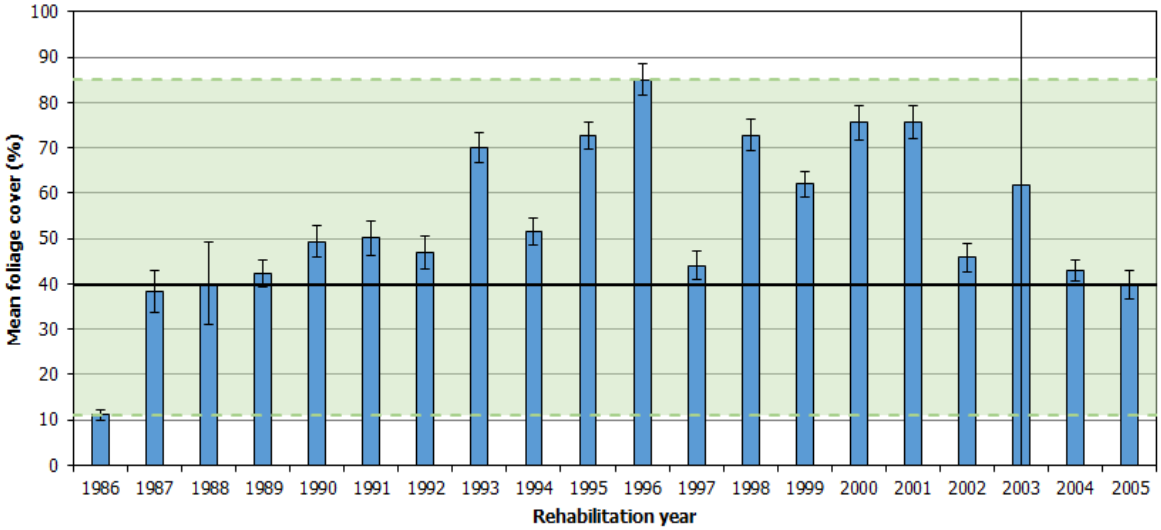


Figure 3f: Mean alive native foliage cover /80 m² ± s.e., for the current assessment (2024) of 20 year old rehabilitation (rehabilitation year 2005) and from previous assessments of 20 year old rehabilitation

Note: Green colour bands show the historic range (from minimum to maximum) for 20-year old rehabilitation. The black line indicates the value from the current (2024) assessment.

The Shannon-Wiener Diversity indices H' values for both density and foliage cover as assessed in 2025 within the 2005 rehabilitation areas were amongst the highest when compared with previous surveys for the same areas (Figure 3g). The highest indices recorded for the density and foliage cover in 2025 was in plots SE MP15 and SW01 MP10 respectively (Table 8c).

The highest Hierarchical Richness Index (HRI) value for the 2005 rehabilitation areas, as assessed in 2025, was calculated for plot NSS MP01 (Table 8c). The 2025 assessment of HRI was slightly lower than the 2015 results (Figure 3h).

Table 8c: Summary of H' for both alive density and cover for alive plants and Hierarchical Richness Index (HRI) values for alive plants in the 2005 Rehabilitation areas monitored in 2025

2005 Rehabilitation		Shannon no H' (native & introduced)		HRI (native)
Pit	Plot	Density	Cover	
NSS	MP01	3.14	2.63	2401
N10.6	MP02	2.55	2.24	2137
N18	MP06	3.41	2.37	1288
SW01	MP10	3.33	2.71	1617
SE13	MP12	3.03	2.52	1841
SE	MP15	3.51	2.18	1418
Min - Mean – Max		2.55 3.16 3.51	2.18 2.44 2.71	1418 1847 2401

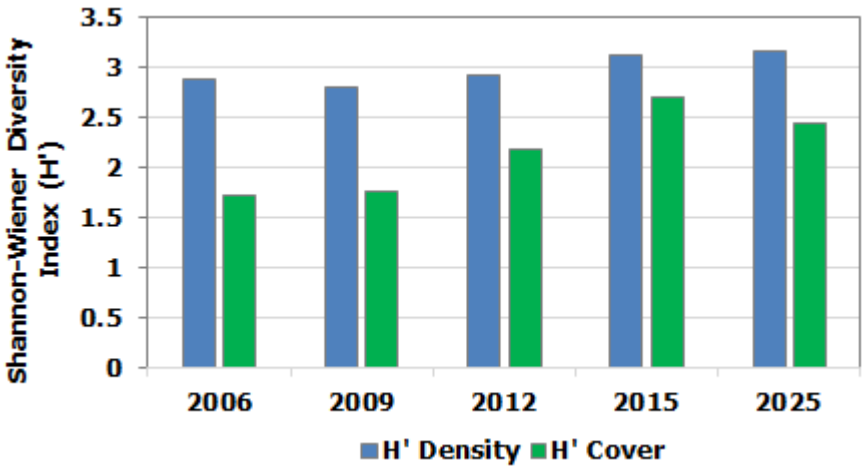


Figure 3g: Mean H' for alive (combined native and introduced) density and foliage cover for the 2005 (20 years) rehabilitation areas over time

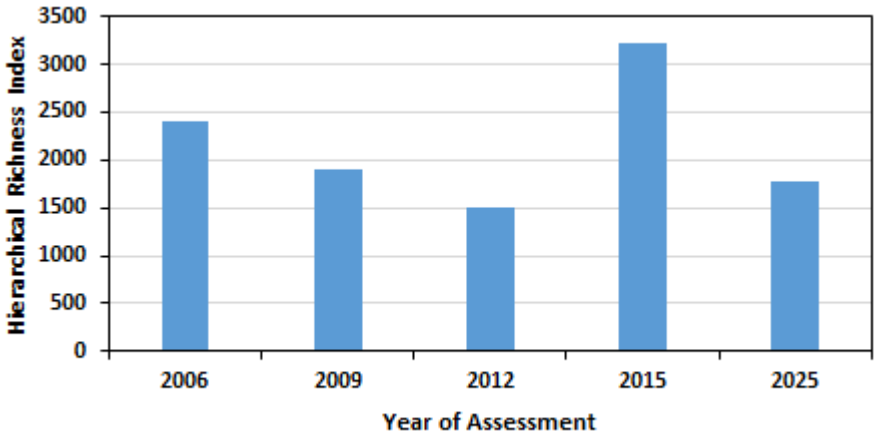


Figure 3h: Hierarchical Richness Index (HRI) for alive native plants in the 2005 rehabilitation areas over time

5.1.4 2015 Rehabilitation (10 years)

One hundred and twenty native and eleven introduced species were recorded, all introduced species are annual species that establish after seasonal rains.

No threatened flora pursuant to the BC Act 2016 and as listed by the DBCA (2026b), or pursuant to the EPBC Act 1999 and listed by the DCCEEW (2026) were recorded within the 2014 rehabilitation areas. Three Priority flora species (*Hibbertia ambita* P1, *Stylidium marradongense* P3 and *Lasiopetalum cardiophyllum* P4) were recorded in the 2015 rehabilitation areas in 2025. Thirteen plants of *Hibbertia ambita* (P1) were recorded in plots ME03-22 MP03 and fourteen plants of *Hibbertia ambita* (P1) in WS08 MP20. Two plants of *Stylidiium marradongense* (P3) were recorded in SW47 Plot MP15 and seven plants of *Lasiopetalum cardiophyllum* (P4) were recorded in SW35 MP14 2025.

Results from the analysis of quadrat data from the 2015 rehabilitation areas are presented in Tables 9a – 9c and Figures 4a – 4h. Within the 2015 rehabilitation areas the native and introduced species richness recorded in 2025 ranged from 35 to 55 species/80 m² and 0 – 6 species/80 m² respectively, with SW47 MP15 recording the highest at 55 native species/80 m² (Table 9a). Overall, the mean native species richness recorded in 2025 for the 2015 rehabilitation areas was 47.00 ± 2.89 species/80 m². Mean native species richness across previous assessments of 10 year old rehabilitation was similar to previous years, with the lowest values occurring in the 2002, 2007 rehabilitation areas (Figure 4a).

Table 9a: Summary of mean alive native and introduced species richness (per 80 m²) of 2015 Rehabilitation areas monitored in 2025

2015 Rehabilitation		Species Richness per 80 m²	
Pit	**Plot**	**Native**	**Introduced**
ME03-22	MP03	43	3
MN34/10-	MP07-V2	35	0
SW21	MP11	48	3
SW35	MP14	51	2
SW47	MP15	55	6
WS08	MP20	50	6
Overall Mean		47.00 ± 2.89	3.33 ± 0.76

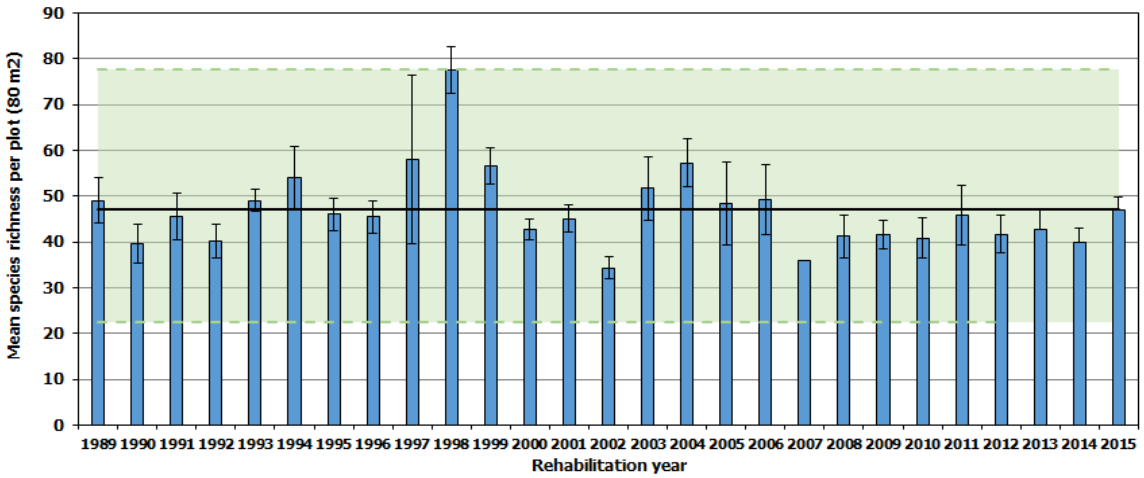


Figure 4a: Mean native species richness (alive and dead species/80 m² ± s.e.) for the current assessment (2025) of 10-year old rehabilitation (rehabilitation year 2015) and from previous assessments of 10-year old rehabilitation

Note: Green colour bands show the historic range (from minimum to maximum) for 10-year-old rehabilitation. The black line indicates the value from the current (2025) assessment.

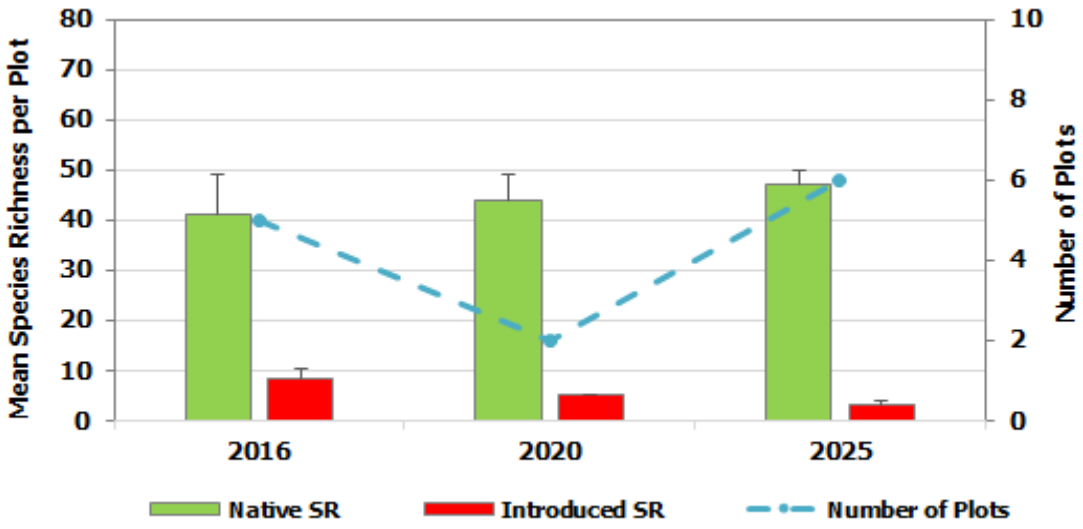


Figure 4b: Mean native and introduced alive species richness (species/80 m² ± s.e.) for the 2015 (10 years) rehabilitation areas

Table 9b: Summary of mean alive and dead plant density/m² (± s.e.) and mean alive and dead foliage cover (%) of 2015 Rehabilitation areas monitored in 2025

2015 Rehabilitation		Mean Plant Density (plants/m²) ± s.e.				Mean Foliage Cover (%) ± s.e.			
Pit	Plot	Native		Introduced		Native		Introduced	
		Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead
ME03-22	MP03	3.15 ± 0.31	0.30 ± 0.05	0.29 ± 0.29	0.13 ± 0.13	32.94 ± 4.75	11.85 ± 3.61	0.05 ± 0.05	0.004 ± 0.004
MN34/10-V2	MP07-V2	1.85 ± 0.37	0.30 ± 0.07	0.00 ± 0.00	0.00 ± 0.00	45.28 ± 5.17	12.52 ± 2.96	0.00 ± 0.00	0.00 ± 0.00
SW21	MP11	3.88 ± 0.51	0.79 ± 0.19	0.36 ± 0.23	0.00 ± 0.00	39.79 ± 4.41	19.31 ± 3.83	0.13 ± 0.09	0.00 ± 0.00
SW35	MP14	8.44 ± 1.10	0.39 ± 0.10	0.49 ± 0.27	0.00 ± 0.00	40.00 ± 4.43	4.78 ± 1.56	0.47 ± 0.40	0.00 ± 0.00
SW47	MP15	9.94 ± 2.10	0.93 ± 0.15	0.75 ± 0.47	0.00 ± 0.00	55.44 ± 4.81	13.98 ± 2.55	0.18 ± 0.12	0.00 ± 0.00
WS08	MP20	6.96 ± 1.04	0.16 ± 0.06	0.96 ± 0.39	0.74 ± 0.39	29.61 ± 5.85	11.91 ± 4.66	0.03 ± 0.01	0.03 ± 0.01
Overall Mean		5.70 ± 0.51	0.48 ± 0.05	0.48 ± 0.13	0.14 ± 0.07	40.51 ± 2.11	12.39 ± 1.39	0.14 ± 0.07	0.004 ± 0.002

Mean native alive plant density in the 2015 rehabilitation areas assessed in 2025 was greatest in SW47 MP15 with 9.94 ± 2.10 plants/m² and noticeably lowest in MN34/10-V2 with 1.85 ± 0.37 plants/m² (Table 9b). The overall mean native alive plant density recorded in 2025 for the 2015 rehabilitation areas (5.70 ± 0.51 plants/m²) is lower than in some previous years when compared to previous assessments of 10 year rehabilitation (Figure 4c). When compared to previous assessments of the same 2015 rehabilitation areas, the mean combined native and introduced alive plant density for the 2025 assessment was higher than in the previous assessment in 2014 (Figure 4d). The density of introduced species was lower at 0.48 ± 0.13 plants/m².

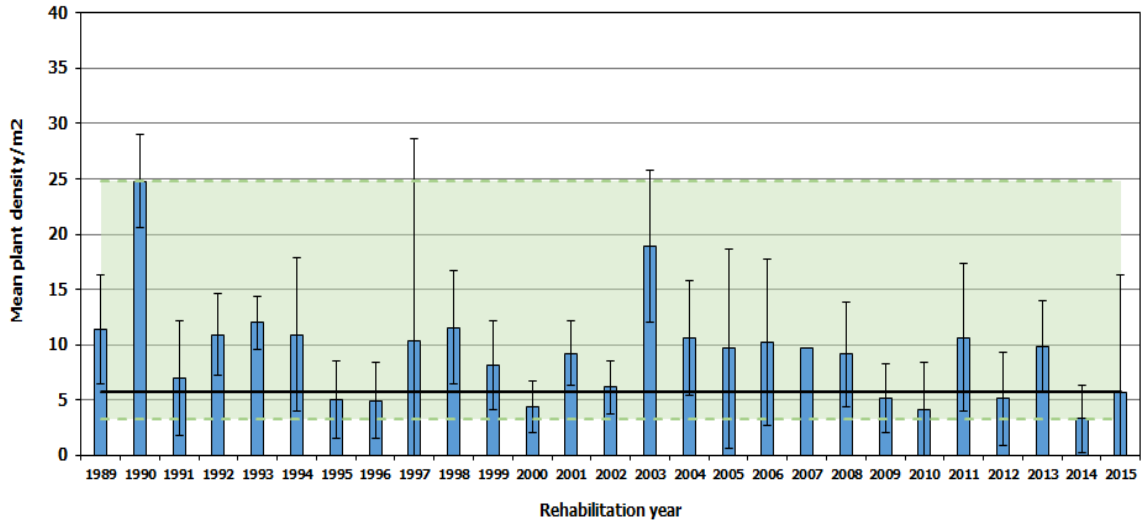


Figure 4c: Mean alive plant density (alive and dead species/80 m² ± s.e.) for the current assessment (2025) of 10-year old rehabilitation (rehabilitation year 2015) and from previous assessments of 10-year old rehabilitation

Note: Green colour bands show the historic range (from minimum to maximum) for 10 year old rehabilitation. The black line indicates the value from the current (2025) assessment.

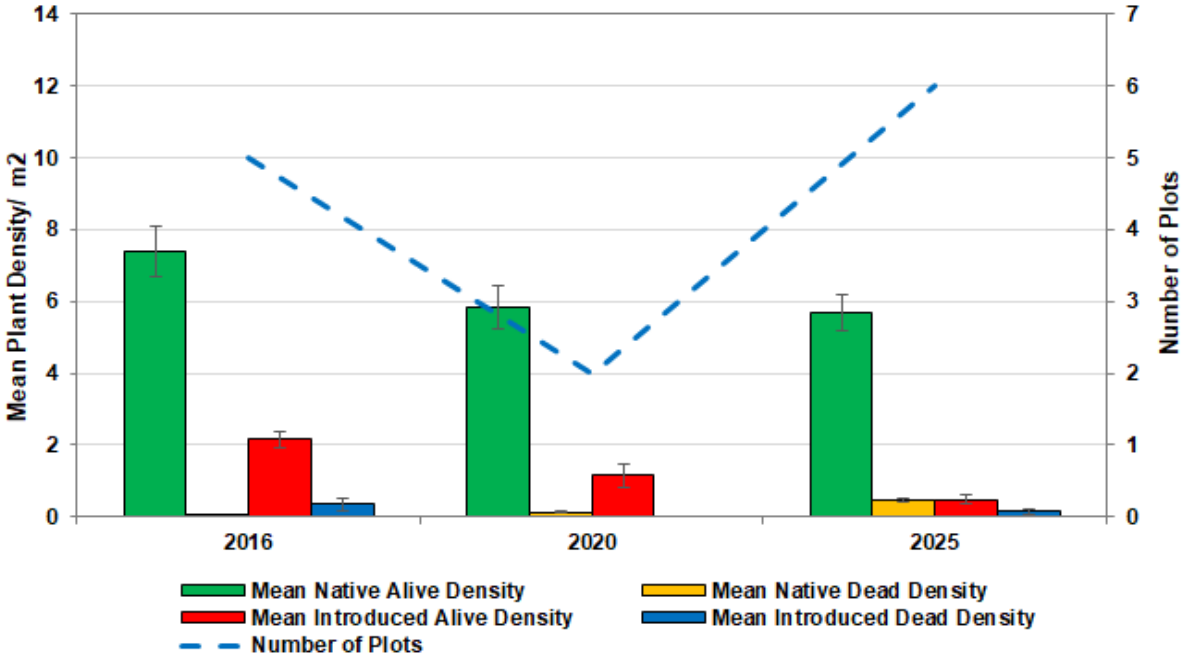


Figure 4d: Mean alive and dead native and introduced plant density (per m² ± s.e.) for the 2015 (10 years) Rehabilitation areas; excludes tree species

Mean native alive foliage cover in the 2015 rehabilitation assessments in 2025 was greatest in SW47 MP15 (55.44% ± 4.81), and lowest in WS08 MP20 with 29.61% ± 5.85 (Table 9b). When compared with previous assessments of 10 year old rehabilitation, this year's overall mean native alive foliage cover (40.51% ± 2.11) was in the lower range of previous years. When compared to previous assessments of 10 year old areas, the 2025 mean combined alive and dead foliage cover was similar to 1993 (Figure 4f). The mean alive foliage cover of introduced species was 0.14% ± 0.07; being consistent with the decline in introduced species in older rehabilitation areas.

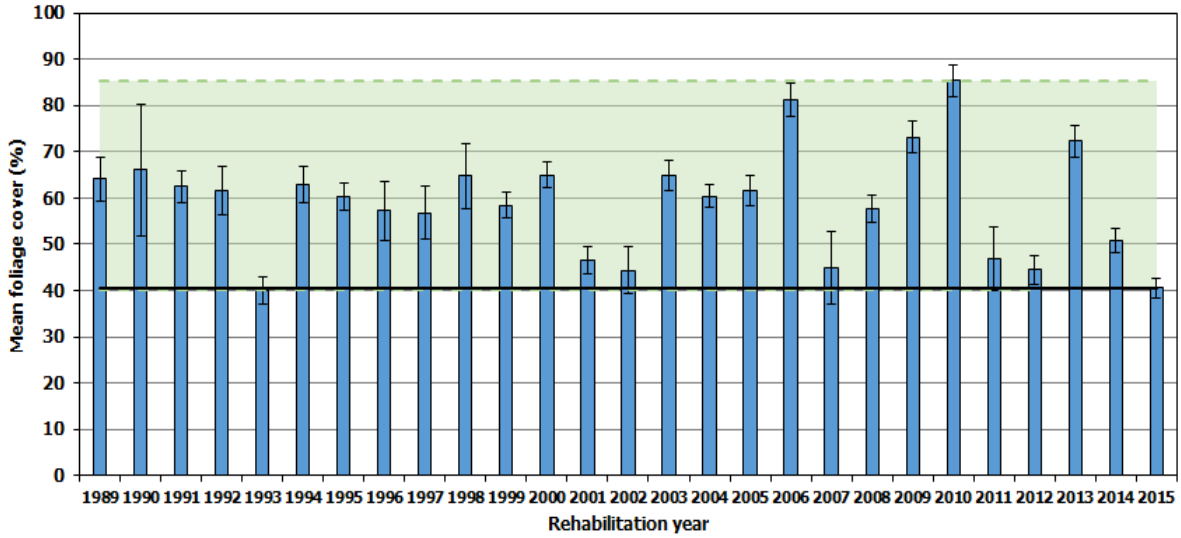


Figure 4e: Mean alive foliage cover (alive and dead species/80 m² ± s.e.) for the current assessment (2025) of 10-year old rehabilitation (rehabilitation year 2015) and from previous assessments of 10-year old rehabilitation

Note: Green colour bands show the historic range (from minimum to maximum) for 10 year old rehabilitation. The black line indicates the value from the current (2025) assessment.

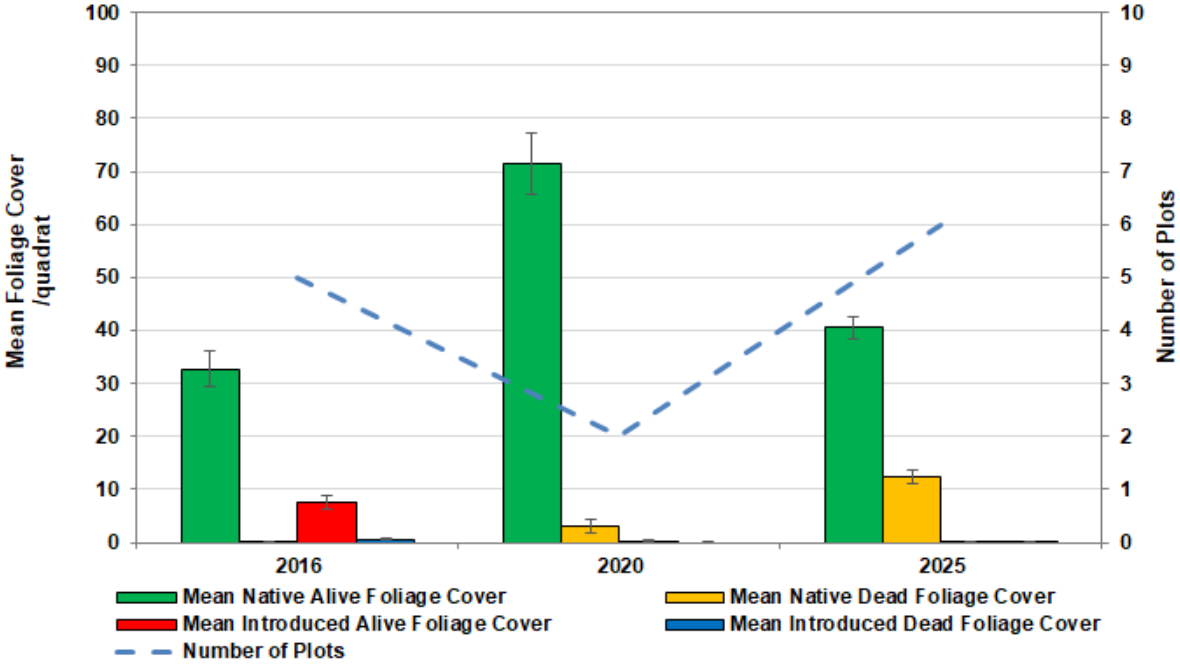


Figure 4f: Mean alive and dead native and introduced foliage cover (% ± s.e.) for the 2015 (10 years) rehabilitation areas; excludes tree species

The Shannon –Wiener Diversity Indices (H') values for both density and foliage cover as assessed in 2025 within the 2015 rehabilitation areas was similar to levels in previous surveys for the same areas. Plot SW21 MP11 had the highest H' for density (3.45) and SW21 MP1 (2.86) had the highest cover recorded in 2025 (Table 9c).

The highest Hierarchical Richness Index (HRI) value for the 2015 rehabilitation areas, as assessed in 2025, was calculated for SW47 MP15 (Table 9c). Of all the assessments of 2015 rehabilitation areas, the 2025 assessment of HRI was higher than in 2016 and 2020 (Figure 4h).

Table 9c: Summary of Shannon-Wiener Diversity indices (H') for both alive density and cover and Hierarchical Richness Index (HRI) values for alive plants in the 2015 Rehabilitation areas monitored in 2025

2015 Rehabilitation		H' (native & introduced)						HRI (native)
Pit	Plot	Density			Cover			
ME03-22	MP03	3.04			2.70			1103
MN34/10-	MP07-	2.93			2.64			555
SW21	MP11	3.45			2.86			1272
SW35	MP14	3.04			2.67			3043
SW47	MP15	2.77			1.94			3693
WS08	MP20	2.93			2.29			2510
Min - Mean - Max		2.77	3.03	3.45	1.94	2.52	2.86	555 2029 3793

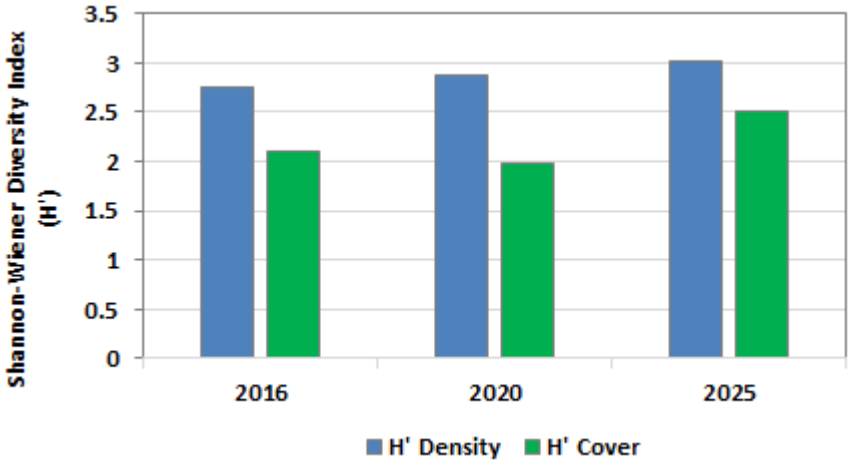


Figure 4g: Mean Shannon-Wiener Diversity indices (H') for alive (combined native and introduced) density and foliage cover for the 2015 (10 years) rehabilitation areas over time

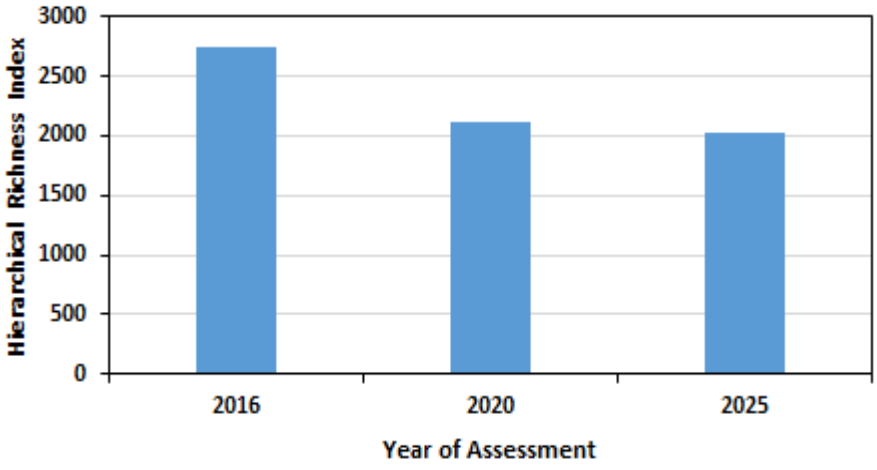


Figure 4h: Hierarchical Richness Index (HRI) for alive native plants in the 2015 rehabilitation areas over time

5.1.5 2020 Rehabilitation (5 years)

One hundred and twenty-five native and eighteen introduced plant species were recorded, all introduced species are annual species that establish after seasonal rains.

No threatened flora pursuant to the BC Act 2016 and as listed by the DBCA (2026b), or pursuant to the EPBC Act 1999 and listed by the DCCEEW (2026) were recorded within the 2019 rehabilitation areas.

Four plants of *Hibbertia ambita* (P1) were recorded in 2020 rehabilitation areas in plot ME12 MP07 in 2025.

Results from the analysis of quadrat data from the 2020 rehabilitation areas presented in Tables 10a – 10c and Figures 5a – 5h.

Table 10a: Summary of mean alive native and introduced species richness (per 80 m²) of 2020 Rehabilitation areas monitored in 2025

2020 Rehabilitation		Species Richness per 80 m²	
Pit	**Plot**	**Native**	**Introduced**
State Forest			
ME12	MP07	60	2
MNE35	MP05	24	14
MS09	MP15	55	2
SW107	MP25	49	4
WM052	MP33	45	6
WM056	MP28	67	0
Overall Mean		50.00 ± 6.10	4.67 ± 2.03

Within the 2020 rehabilitation areas the native and introduced species richness recorded in 2025 ranged from 24 – 67 species/80 m² and 0 – 14 species/80 m² respectively, with plot WM056 MP28 having the highest native species richness. Overall, the mean native species richness recorded in this year's assessment for the 2020 rehabilitation areas was 50.00 ± 6.10 species/80 m² (Table 10a). Mean species richness for the 2020 rehabilitation year (as assessed in 2025) was within the mid-range of species richness for previous 5 year old rehabilitation assessments (Figure 5a). Compared with the previous assessment (2021) of the same 2010 rehabilitation areas, the mean native alive and dead species richness in 2025 was similar for native species but had declined slightly for both native and introduced species (Figure 5b).

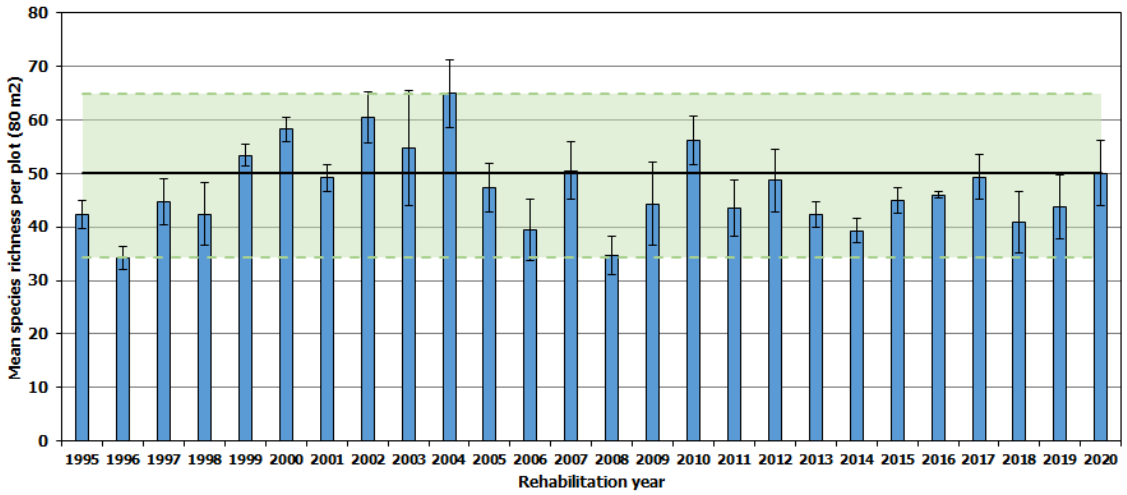


Figure 5a: Mean native species richness (alive and dead species/80 m² ± s.e.) for the current assessment (2025) of 5-year old rehabilitation (rehabilitation year 2020) and from previous assessments of 5-year old rehabilitation

Note: Green colour bands show the historic range (from minimum to maximum) for 5-year old rehabilitation. The black line indicates the value from the current (2025) assessment.

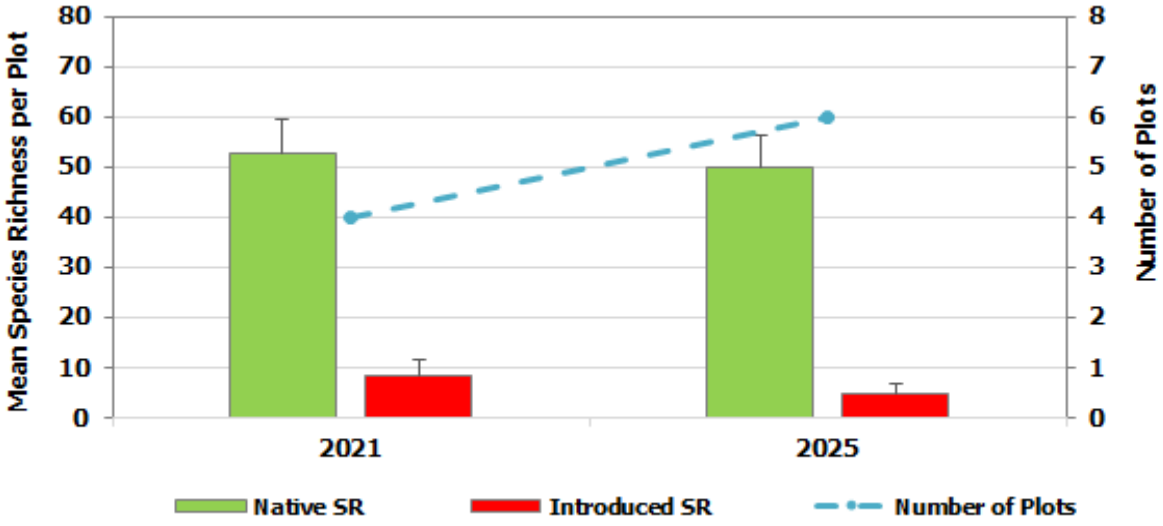


Figure 5b: Mean native and introduced species richness (species/80 m² ± s.e.) for the 2020 (5 years) rehabilitation areas over time

Table 10b: Summary of mean alive and dead plant density/m² (± s.e.) and mean alive and dead foliage cover (%) of 2020 Rehabilitation areas monitored in 2025

2020 Rehabilitation		Mean Plant Density (plants/m²) ± s.e.				Mean Foliage Cover (%) ± s.e.			
Pit	Plot	Native		Introduced		Native		Introduced	
		Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead
ME12	MP07	5.65 ± 0.87	0.09 ± 0.05	0.11 ± 0.08	0.01 ± 0.01	21.73 ± 3.10	0.51 ± 0.40	0.01 ± 0.01	0.01 ± 0.01
MNE35	MP05	4.00 ± 0.71	0.15 ± 0.05	7.38 ± 1.58	1.13 ± 0.41	30.36 ± 6.29	8.89 ± 3.33	0.53 ± 0.19	0.06 ± 0.02
MS09	MP15	4.49 ± 0.40	0.00 ± 0.00	0.04 ± 0.03	0.00 ± 0.00	38.44 ± 3.97	0.00 ± 0.00	0.03 ± 0.03	0.00 ± 0.00
SW107	MP25	7.98 ± 1.06	0.41 ± 0.08	0.85 ± 0.46	0.00 ± 0.00	68.52 ± 7.07	3.20 ± 0.77	0.11 ± 0.07	0.00 ± 0.00
WM052	MP33	4.29 ± 0.60	0.66 ± 0.29	1.39 ± 0.54	1.74 ± 0.55	30.48 ± 5.00	3.13 ± 1.77	0.08 ± 0.04	0.06 ± 0.02
WM056	MP28	5.39 ± 0.44	0.06 ± 0.03	0.00 ± 0.00	0.00 ± 0.00	36.21 ± 3.84	0.15 ± 0.08	0.00 ± 0.00	0.00 ± 0.00
Overall Mean		5.30 ± 0.31	0.23 ± 0.06	1.63 ± 0.37	0.48 ± 0.13	37.62 ± 2.44	2.64 ± 0.69	0.13 ± 0.04	0.02 ± 0.005

Mean native alive plant density in the 2020 rehabilitation areas as assessed in 2025 was highest in SW107 MP25 with 7.98 ± 1.06 plants/m² and lowest in MNE35 MP05 with 4.00 ± 0.71 plants/m² (Table 10b). Mean introduced alive plant density was highest in MNE35 MP05 with 7.38 ± 1.58 plants/m² and lowest in WM056 MP28 with 0.00 ± 0.00 plants/m² (Table 10b). Mean alive plant density for the 2020 rehabilitation areas as recorded in this year's assessment (5.30 ± 0.31 plants/m²) was one of the lowest when compared to previous assessments of other 5 year old rehabilitation. The mean alive native density recorded in 2025 for the 2020 rehabilitation areas was amongst the lowest in similar aged rehabilitation areas (Figure 5c).

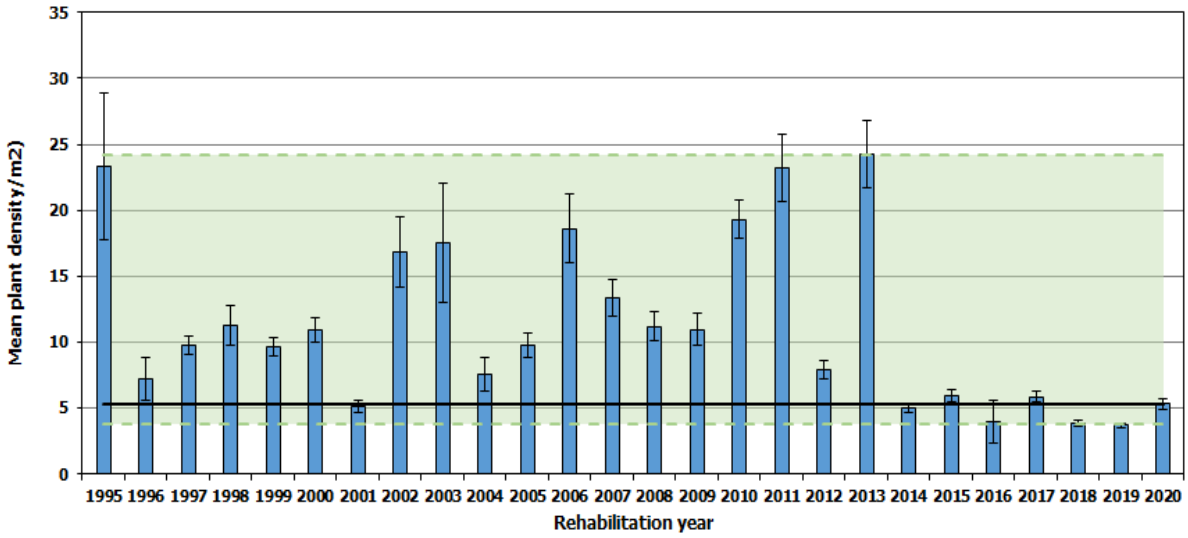


Figure 5c: Mean alive plant density (/80 m² ± s.e.) for the current assessment (2024) of 5-year old rehabilitation (rehabilitation year 2020) and from previous assessments of 5-year old rehabilitation

Note: Green colour bands show the historic range (from minimum to maximum) for 5-year old rehabilitation. The black line indicates the value from the current (2025) assessment.

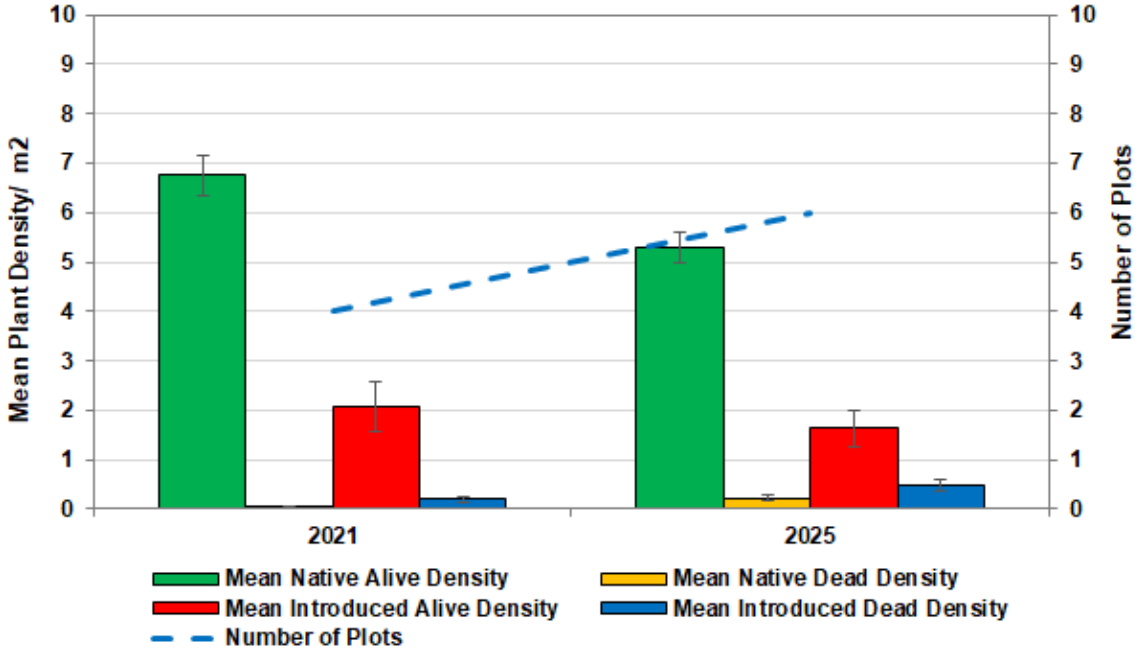


Figure 5d: Mean alive and dead native and introduced plant density (per m² ± s.e.) for the 2020 (5 years) rehabilitation areas

Mean native alive foliage cover in the 2020 rehabilitation areas recorded in 2025 was highest SW107 MP25 with 68.52% ± 7.07, whilst the lowest was recorded in ME12 MP07 with 21.73% ± 3.10 (Table 10b). When compared with previous assessments of other 5 year old rehabilitation, this year's overall mean native alive foliage cover (37.62% ± 2.44) was similar to that in the previous years (Figure 5e). In the 2020 rehabilitation areas, the mean combined native alive foliage cover measured in 2024 was similar to previous years at 5 years with an increase in growth (Figure 5f).

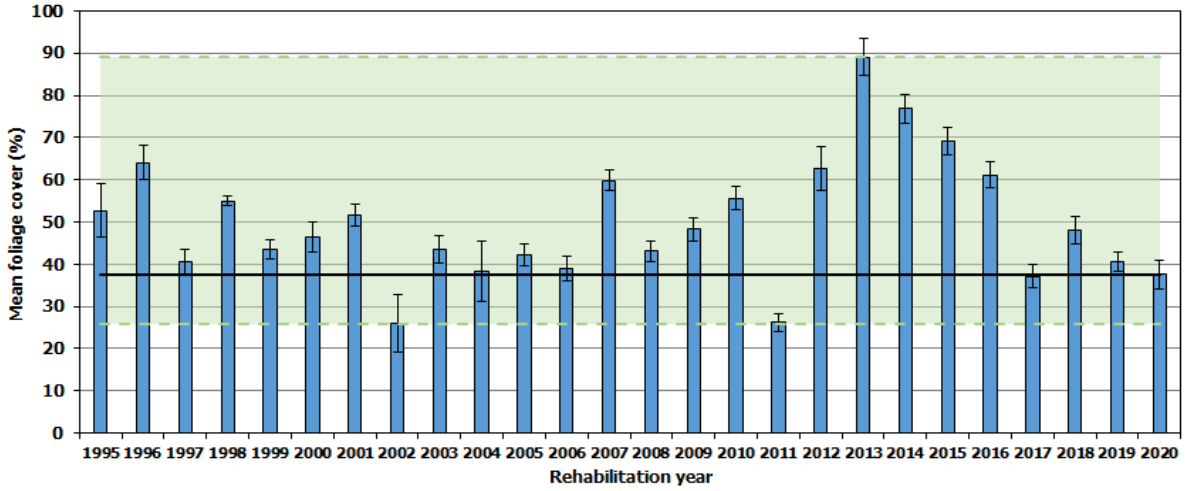


Figure 5e: Mean alive foliage cover (/80 m² ± s.e.) for the current assessment (2025) of 5-year old rehabilitation (rehabilitation year 2020) and from previous assessments of 5-year old rehabilitation

Note: Green colour bands show the historic range (from minimum to maximum) for 5-year old rehabilitation. The black line indicates the value from the current (2025) assessment.

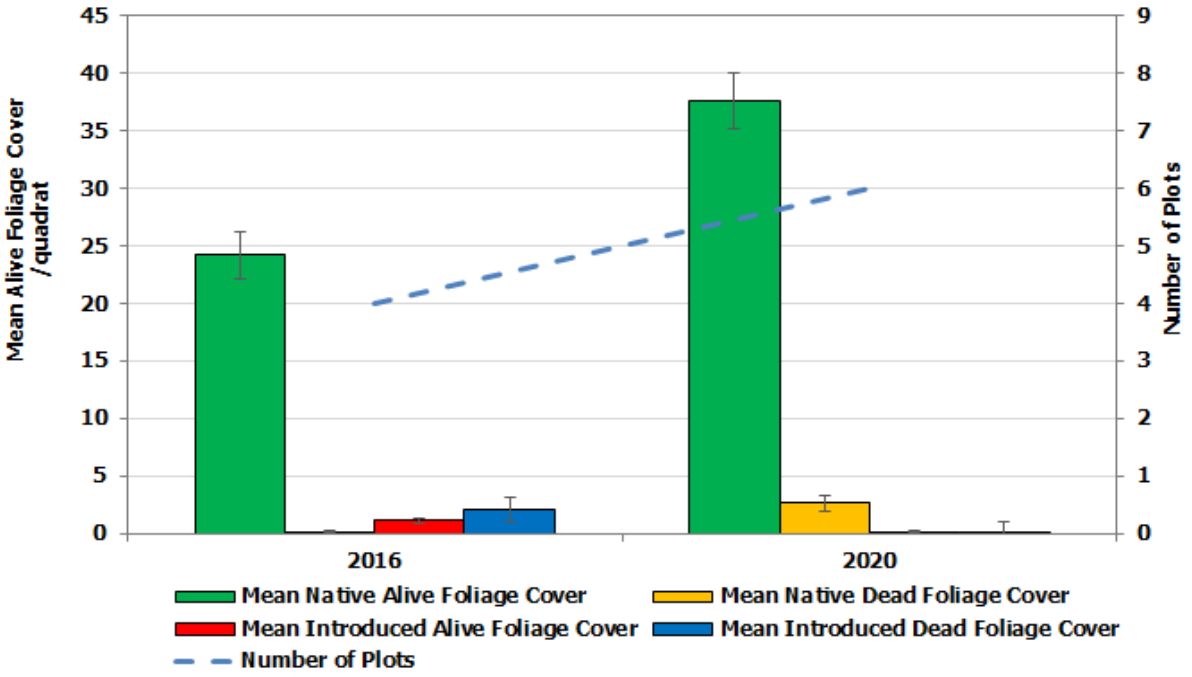


Figure 5f: Mean alive and dead native and introduced alive foliage cover (% ± s.e.) for the 2020 (5 years) rehabilitation areas

Plot WM056 MP28 had the highest Shannon –Wiener Diversity Indices H' for density (3.39) and Plot ME12 MP07 had the highest for cover (2.99) recorded in 2025 (Table 10c). When compared to the previous (2021) assessment of the same 2020 rehabilitation areas, H' for the density and cover was lower in 2025 (Figure 5g).

The highest Hierarchical Richness Index (HRI) value for the 2020 rehabilitation areas, as assessed in 2025, was calculated for plot SW107 MP25 (Table 10c). Of all the assessments of 2020 rehabilitation areas, the 2025 assessment of HRI was lower than in the previous assessment in 2021 (Figure 5h).

Table 10c: Summary of Shannon-Wiener Diversity indices (H') for alive density and cover and Hierarchical Richness Index (HRI) values for alive plants in the 2020 Rehabilitation areas monitored in 2025

2020 Rehabilitation		H' (native & introduced)						HRI (native)
Pit	Plot	Density			Cover			
ME12	MP07	3.29			2.99			1944
MNE35	MP05	2.54			2.05			1514
MS09	MP15	3.04			2.13			1577
SW107	MP25	2.82			2.20			2994
WM052	MP33	3.32			2.35			1385
WM056	MP28	3.39			2.95			1911
Min - Mean - Max		2.54	3.07	3.39	2.05	2.45	2.99	1385 1887.5 2994

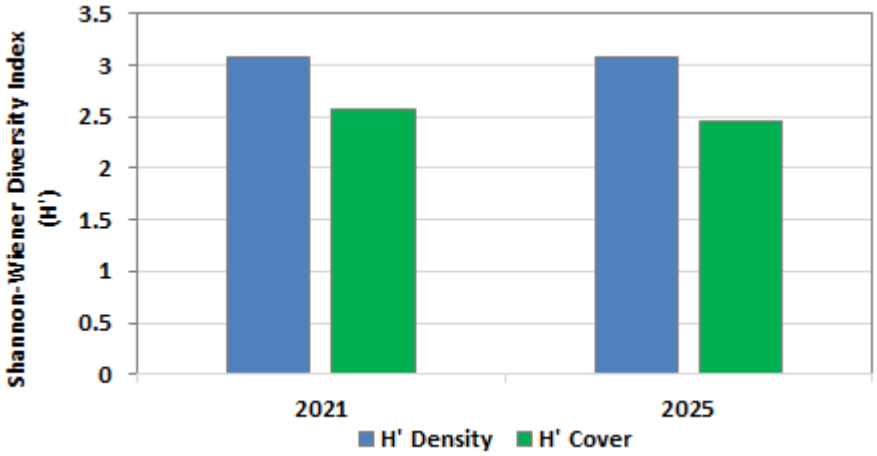


Figure 5g: Mean Shannon-Wiener Diversity indices (H') for alive (combined native and introduced) density and foliage cover for the 2020 (5 years) rehabilitation areas over time

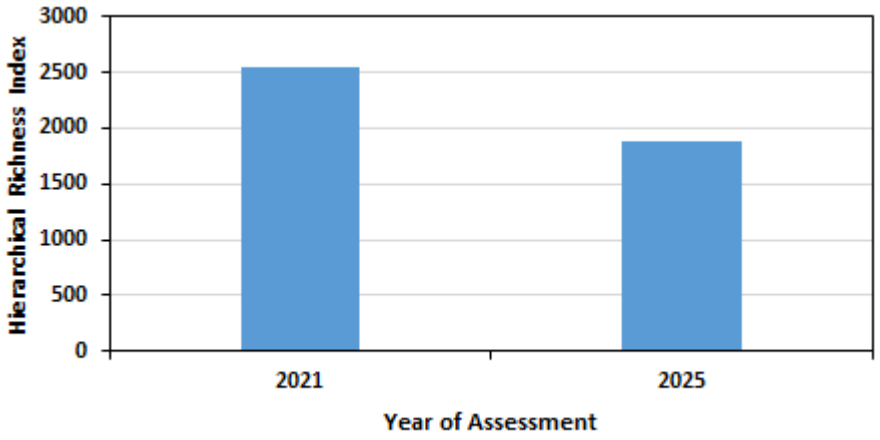


Figure 5h: Hierarchical Richness Index (HRI) for alive native plants in the 2020 rehabilitation areas over time

5.1.6 2024 Rehabilitation (15 months)

Two hundred and thirty-six native and thirty-five introduced plant species were recorded on 2024 rehabilitation areas in 2025. Most of introduced species are annual species that establish after seasonal rains.

No threatened flora pursuant to the BC Act 2016 and as listed by the DBCA (2026b), or pursuant to the EPBC Act 1999 and listed by the DCCEEW (2026) were recorded within the 2024 rehabilitation areas.

One *Lasiopetalum cardiophyllum* (P4) as listed by the DBCA (2025a) was recorded in the 2024 rehabilitation areas in SW52 MP20 in 2025.

Within the 2024 rehabilitation areas, mean native species richness recorded in 2025 ranged from 32 - 76 species/80 m² (Table 11a). Introduced species richness ranged from 0–13 species/80 m² within the 2024rehabilitation areas. The overall mean native species richness for all 2024 rehabilitation plots assessed in 2025 was 51.03 ± 1.75 species/80 m² for all plots and pits. The mean native species richness for the 2024 rehabilitation areas was relatively high when compared with some of the previous assessments at 15 months (Figure 6a).

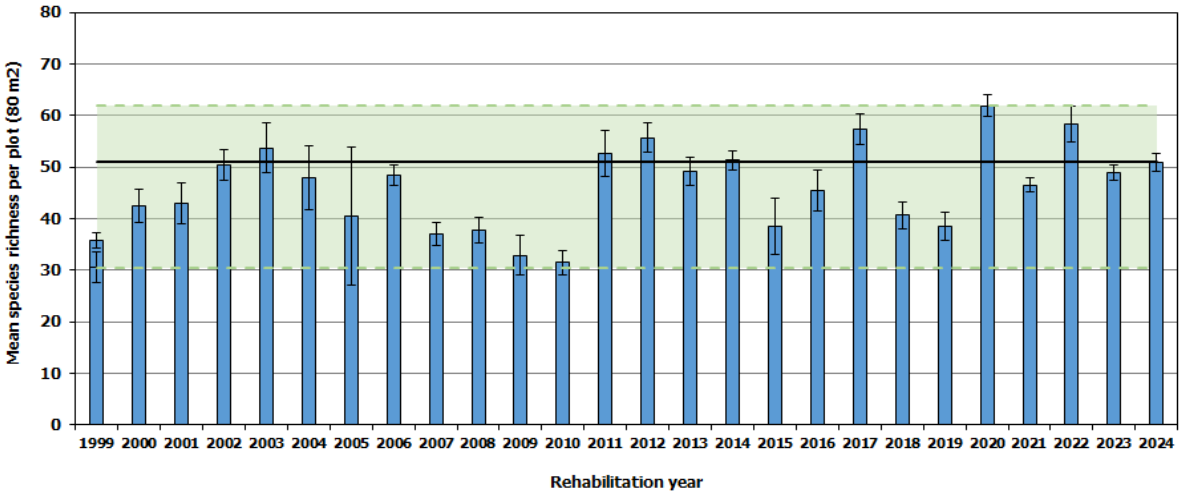


Figure 6a: Mean native species richness (alive and dead species/80 m² ± s.e.) for the current assessment (2025) of 15-month rehabilitation (rehabilitation year 2024) and from previous assessments of 15-month-old rehabilitation areas

Note: Green colour bands show the historic range (from minimum to maximum) for 15-Month-old rehabilitation. The black line indicates the value from the current (2025) assessment.

Mean native alive plant density in the 2024 rehabilitation areas recorded in 2025 was the highest in pit WS2E MP40 (12.83 ± 1.45 plants/m²), Figure 6b. The overall mean native alive density was 6.56 ± 0.14 plants/m² for all plots. The lowest mean alive plant density was recorded in WM056-S6 MP33 (2.55 ± 0.27 plants/m²). Only one plot in forest areas was below the 3 plants/m2; namely WM056-S6 MP33. The highest mean introduced alive plant density was recorded in WM056-S6 MP35 (4.91 ± 0.90 plants/m²) (Table 11b).

Mean native alive foliage cover for the 2024 rehabilitation areas was highest in SE108 MP17 with 36.52% ± 4.98, Figure 6c, Table 11b. The lowest mean native alive plant foliage cover was recorded in QU02 MP05 (0.66% ± 0.11). The overall mean alive native plant foliage cover was 9.56% ± 1.28. The highest mean introduced alive foliage cover was recorded in WM056-S6 MP31 with 2.20% ± 0.82), much higher than the mean of all 2024 rehabilitation plots assessed in 2025 (0.23% ± 0.12), Table 11b.

Table 11a: Summary of mean alive native and introduced species richness (per 80 m²) of 2024 Rehabilitation areas monitored in 2025
(Note: no Private Property (PP) present in rehabilitation areas in 2025 assessment)

2024 Rehabilitation Areas		Species Richness per 80 m²	
Pit	**Plot**	**Native**	**Introduced**
MW40	2	55	11
NO08	3	50	0
QU02	4	48	13
QU02	5	40	0
QU02	6	48	11
QU02	7	54	9
QU02	8	58	12
QU02-S5	9	38	0
QU03	10	57	8
QU03	11	54	8
QU03	12	60	3
QU03	13	35	12
QU03	14	64	10
QU03	15	48	6
SE108	16	43	1
SE108	17	32	8
SW16	18	41	0
SW16	19	42	1
SW52	20	47	1
WM048	21	44	4
WM052-S18	22	47	0
WM055-S3	23	63	6
WM055-S3	24	67	4
WM055_S3	25	66	6
WM055-S3-DR	26	66	7
WM055-S3-DR	27	57	9
WM056-S11	28	67	10
WM056-S11	29	49	7
WM056-S6	30	39	9
WM056-S6	31	51	13
WM056-S6	32	41	11
WM056-S6	33	33	5
WM056-S6	34	38	13
WM056-S6	35	48	13
WM056-S6	36	48	6
WM056-S6	37	47	13
WS09	38	76	6
WS09	39	61	8
WS2E	40	68	0
Mean Species Richness (± SE)		**51.03 ± 1.75**	**6.77 ± 0.62**

Table 11b: Summary of mean alive and dead plant density/m² (± s.e.) and mean alive and dead foliage cover (%) for both native and introduced species of 2024 rehabilitation areas monitored in 2025
(Note: no Private Property (PP) present in rehabilitation areas in 2025 assessment)

2024 Rehabilitation		Mean Plant Density (plants/m²) ± s.e.				Mean Foliage Cover (%) ± s.e.			
Pit	Plot	Native		Introduced		Native		Introduced	
		Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead
MW40	2	6.95 ± 0.91	1.74 0.69	1.01 ± 0.18	2.01 ± 0.49	3.60 ± 0.62	0.16 ± 0.06	0.13 ± 0.05	0.27 ± 0.08
NO08	3	6.18 ± 0.58	0.21 ± 0.16	0.00 ± 0.00	0.00 ± 0.00	35.23 ± 3.91	0.01 ± 0.005	0.00 ± 0.00	0.00 ± 0.00
QU02	4	6.48 ± 0.62	0.11 ± 0.08	2.08 ± 0.60	1.80 ± 0.56	1.50 ± 0.25	0.005 ± 0.003	0.05 ± 0.01	0.12 ± 0.06
QU02	5	4.85 ± 0.46	0.01± 0.01	0.00 ± 0.00	0.00 ± 0.00	0.66 ± 0.11	0.002 ± 0.002	0.00 ± 0.00	0.00 ± 0.00
QU02	6	4.88 ± 0.51	0.00 ± 0.00	0.46 ± 0.24	0.23 ± 0.09	2.19 ± 0.48	0.00 ± 0.00	0.02 ± 0.01	0.01 ± 0.004
QU02	7	6.38 ± 0.48	0.01 ± 0.01	0.13 ± 0.06	0.19 ± 0.11	2.63 ± 0.43	0.001 ± 0.001	0.004 ± 0.001	0.02 ± 0.01
QU02	8	5.63 ± 0.66	0.04 ± 0.02	1.76 ± 0.52	0.48 ± 0.14	2.61 ± 1.10	0.03 ± 0.03	0.07 ± 0.02	0.01 ± 0.006
QU02-S5	9	6.13 ± 0.61	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.35 ± 0.06	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00
QU03	10	8.70 ± 0.73	0.24 ± 0.12	0.31 ± 0.27	0.64 ± 0.35	5.74 ± 1.68	0.02± 0.01	0.01 ± 0.007	0.06 ± 0.03
QU03	11	5.45 ± 0.32	2.14 ± 0.68	0.26 ± 0.06	2.11 ± 0.53	14.01 ± 3.55	0.04 ± 0.01	0.38 ± 0.17	0.22 ± 0.08
QU03	12	7.44 ± 0.54	0.11 ± 0.06	0.03 ± 0.02	0.01 ± 0.01	2.97 ± 0.64	0.007 ± 0.003	0.001 ± 0.001	0.001 ± 0.001
QU03	13	9.44 ± 2.58	2.28 ± 0.80	2.50 ± 0.58	1.84 ± 0.47	5.48 ± 1.62	0.03 ± 0.01	0.19 ± 0.05	0.08 ± 0.03
QU03	14	9.19 ± 0.91	2.59 ± 0.86	0.60 ± 0.20	1.81 ± 0.48	5.98 ± 0.75	0.04 ± 0.01	0.08 ± 0.04	0.08 ± 0.02
QU03	15	6.84 ± 0.40	0.06 ± 0.03	0.13 ± 0.04	0.06 ± 0.04	6.45 ± 1.00	0.007 ± 0.004	0.01 ± 0.003	0.004 ± 0.003
SE108	16	7.89 ± 0.73	0.00 ± 0.00	0.01 ± 0.01	0.00 ± 0.00	4.05 ± 1.12	0.00 ± 0.00	0.002 ± 0.002	0.00 ± 0.00
SE108	17	4.55 ± 0.53	0.03 ± 0.03	0.36 ± 0.18	0.08 ± 0.03	36.52 ± 4.98	0.001 ± 0.001	0.19 ± 0.08	0.06 ± 0.05
SW16	18	5.35 ± 0.58	0.03 ± 0.02	0.00 ± 0.00	0.00 ± 0.00	1.41 ± 0.42	0.03 ± 0.03	0.00 ± 0.00	0.00 ± 0.00
SW16	19	6.60 ± 0.51	0.01 ± 0.01	0.01 ± 0.01	0.00 ± 0.00	3.07 ± 0.76	0.002 ± 0.002	0.002 ± 0.002	0.01 ± 0.003
SW52	20	7.10 ± 0.65	0.00 ± 0.00	0.01 ± 0.01	0.00 ± 0.00	2.63 ± 0.93	0.00 ± 0.00	0.001 ± 0.001	0.00 ± 0.00
WM048	21	5.28 ± 0.37	0.38 ± 0.22	0.03± 0.03	0.05 ± 0.02	13.01 ± 1.96	0.06 ± 0.03	0.001 ± 0.001	0.005 ± 0.003

Table 11b: Summary of mean alive and dead plant density/m² (± s.e.) and mean alive and dead foliage cover (%) for both native and introduced species of 2024 Rehabilitation areas monitored in 2025 (continued)

2024 Rehabilitation		Mean Plant Density (plants/m²) ± s.e.				Mean Foliage Cover (%) ± s.e.			
Pit	Plot	Native		Introduced		Native		Introduced	
		Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead
WM052-S18	22	3.35 ± 0.26	0.01 ± 0.01	0.00 ± 0.00	0.00 ± 0.00	2.45 ± 0.45	0.003 ± 0.00	0.00 ± 0.00	0.00 ± 0.00
WM055-S3	23	6.95 ± 0.71	1.73 ± 0.68	0.20 ± 0.10	0.34 ± 0.09	3.54 ± 0.49	0.063 ± 0.03	0.02 ± 0.006	0.07 ± 0.05
WM055-S3	24	8.81 ± 1.08	0.45 ± 0.19	0.31 ± 0.09	0.55 ± 0.16	4.52 ± 1.02	0.01 ± 0.004	0.05 ± 0.03	0.09 ± 0.03
WM055_S3	25	7.83 ± 0.76	0.95 ± 0.57	0.21 ± 0.07	0.39 ± 0.15	3.78 ± 1.00	0.03 ± 0.02	0.02 ± 0.008	0.06 ± 0.04
WM055-S3-DR	26	6.59 ± 0.68	1.05 ± 0.30	0.76 ± 0.31	2.39 ± 0.50	7.24 ± 1.15	0.08 ± 0.05	0.02 ± 0.007	0.09 ± 0.02
WM055-S3-DR	27	4.54 ± 0.26	0.38 ± 0.08	0.58 ± 0.22	4.69 ± 0.77	6.55 ± 1.63	0.03 ± 0.01	0.03 ± 0.008	0.46 ± 0.10
WM056-S11	28	6.30 ± 0.48	0.06 ± 0.06	0.20 ± 0.06	0.08 ± 0.04	12.46 ± 1.86	0.01± 0.01	0.08 ± 0.05	0.008 ± 0.005
WM056-S11	29	5.53 ± 0.38	0.00 ± 0.00	1.66 ± 0.51	0.83 ± 0.49	11.99 ± 2.07	0.00 ± 0.00	0.23 ± 0.09	0.08 ± 0.03
WM056-S6	30	5.56 ± 0.76	0.00 ± 0.00	2.03 ± 0.53	0.34 ± 0.14	33.94 ± 6.14	0.15 ± 0.15	1.85 ± 1.04	0.24 ± 0.11
WM056-S6	31	8.64 ± 1.01	0.08 ± 0.05	3.13 ± 0.74	0.63 ± 0.28	23.35 ± 3.09	0.05 ± 0.03	2.20 ± 0.82	0.30 ± 0.14
WM056-S6	32	6.68 ± 0.68	0.03 ± 0.02	2.93 ± 0.86	0.33 ± 0.12	15.27 ± 2.91	0.008 ± 0.005	1.98 ± 0.95	0.07 ± 0.03
WM056-S6	33	2.55 ± 0.27	0.00 ± 0.00	0.10 ± 0.04	0.11 ± 0.04	24.52 ± 6.18	0.01 ± 0.01	0.10 ± 0.06	0.26 0.14
WM056-S6	34	4.79 ± 0.36	0.00 ± 0.00	2.78 ± 0.54	0.53 ± 0.12	26.10 ± 3.68	0.03 ± 0.03	0.49 ± 0.22	0.46 ± 0.19
WM056-S6	35	6.75 ± 0.89	0.01 ± 0.01	4.91 ± 0.90	0.98 ± 0.39	8.91 ± 3.07	0.06 ± 0.05	0.55 ± 0.18	0.24 ± 0.14
WM056-S6	36	4.40 ± 0.56	0.00 ± 0.00	0.86 ± 0.47	0.03 ± 0.03	6.37 ± 2.40	0.00 ± 0.00	0.04 ± 0.02	0.003 ± 0.003
WM056-S6	37	4.80 ± 0.38	0.04 ± 0.04	1.13 ± 0.32	0.16 ± 0.06	7.76 ± 1.78	0.01 ± 0.01	0.90 ± 0.02	0.13 ± 0.07
WS09	38	11.88 ± 1.02	0.08 ± 0.06	0.40 ± 0.17	0.16 ± 0.10	7.55 ± 1.49	0.003 ± 0.003	0.01 ± 0.003	0.02 ± 0.01
WS09	39	5.80 ± 0.62	0.09 ± 0.05	0.38 ± 0.17	0.03 ± 0.02	9.65 ± 1.22	0.17 ± 0.11	0.06 ± 0.05	0.01 ± 0.007
WS2E	40	12.83 ± 1.45	0.01 ± 0.01	0.40 ± 0.02	0.00 ± 0.00	8.40 ± 1.55	0.01 ± 0.01	0.06 ± 0.004	0.00 ± 0.00
Overall Mean (± SE)		**6.56 ± 0.14**	**0.38 ± 0.05**	**0.83 ± 0.07**	**0.61 ± 0.0.5**	**9.56 ± 1.28**	**0.03 ± 0.01**	**0.23 ± 0.12**	**0.09 ± 0.03**

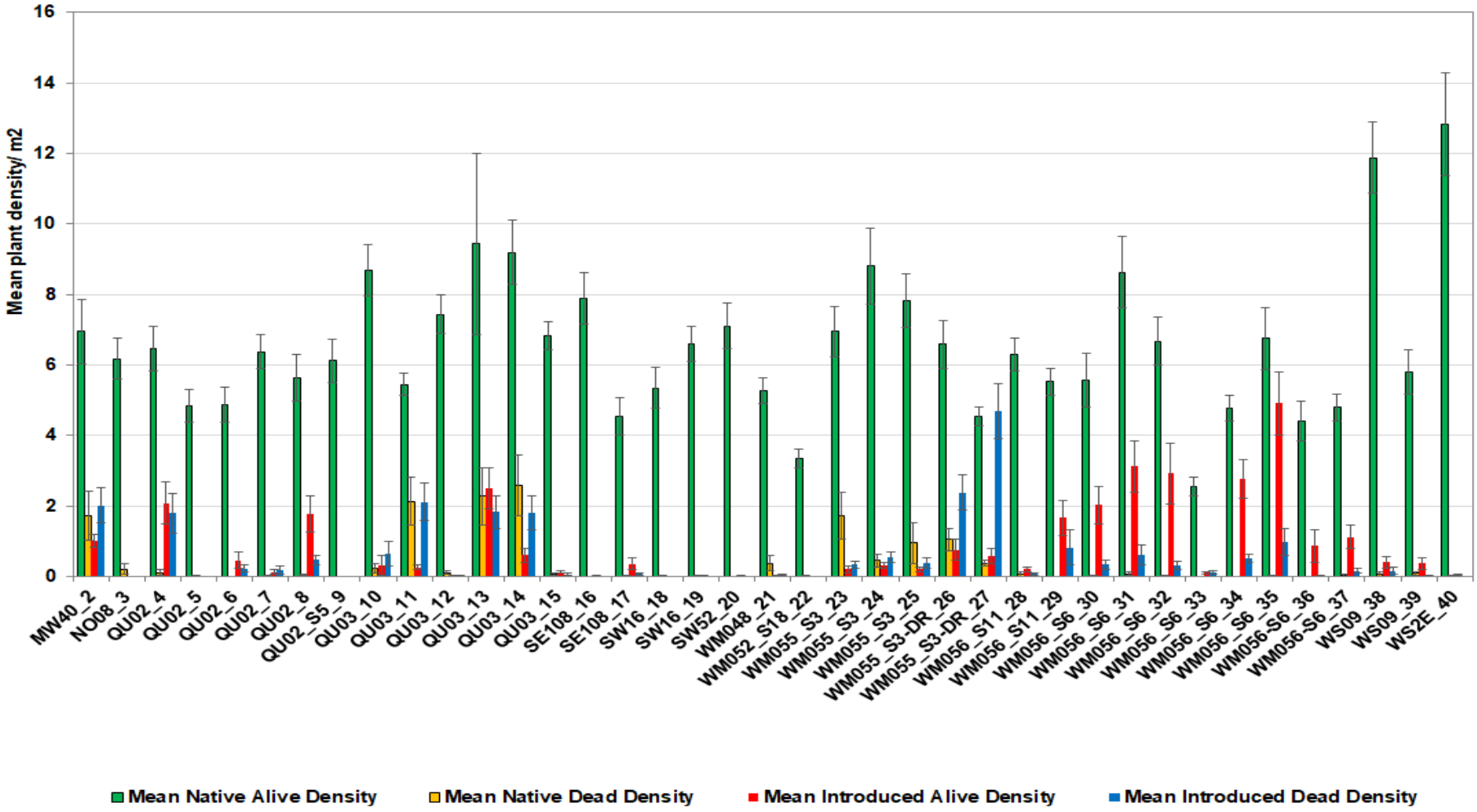


Figure 6b: Mean alive and dead native and introduced plant density (per m² ± s.e.) for the 2024 (15 month) rehabilitation areas

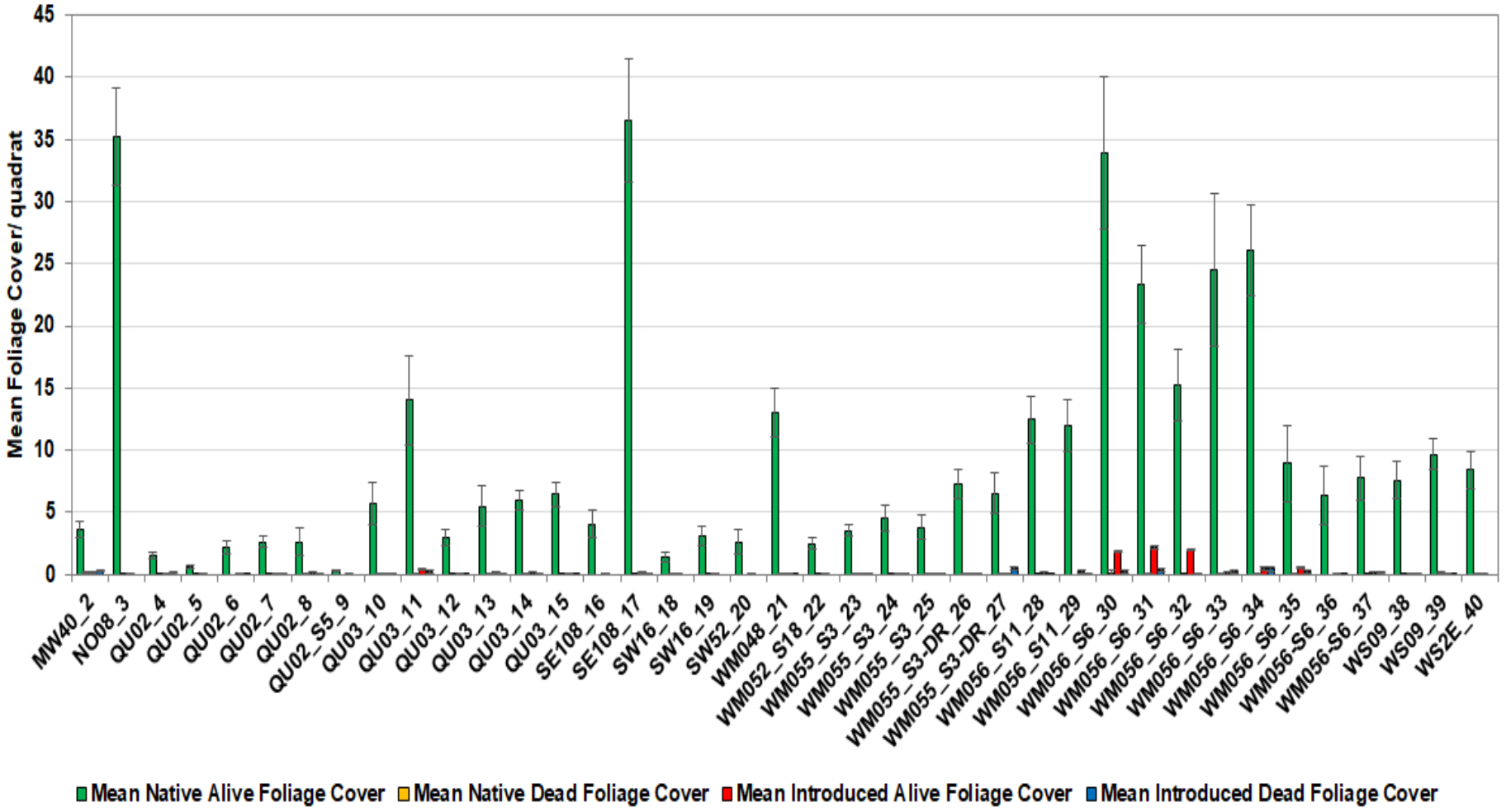


Figure 6c: Mean native and introduced alive foliage cover (% ± s.e.) for the 2024 (15 month) rehabilitation areas

The Shannon-Wiener Diversity Index (H') based on plant density within the 2024 rehabilitation areas ranged from 2.13 to 3.51 (Table 11c). Based on foliage cover data, H' within the 2024 rehabilitation areas ranged from 0.48–3.18. These results were similar to the range in previous 15 month assessments. The highest Hierarchical Richness Index (HRI) value for the 2024 rehabilitation areas, as assessed in 2025, was calculated for WS2E MP40 (Table 11c) and the lowest was recorded in WM056-S6 MP33.

Table 11c: Summary of Shannon-Wiener Diversity indices (H') for alive density and cover for alive native plants and Hierarchical Richness Index (HRI) values for alive plants in the 2024 rehabilitation areas monitored in 2025

2024 Rehabilitation		H' (native & introduced)		HRI (native)
Pit	Plot	Density	Cover	
MW40	2	3.51	2.58	2551
NO08	3	3.07	0.95	2303
QU02	4	3.08	2.60	2507
QU02	5	2.85	2.78	1934
QU02	6	3.09	2.35	1899
QU02	7	3.19	2.47	2416
QU02	8	3.37	1.61	2029
QU02-S5	9	2.43	2.77	2404
QU03	10	3.23	2.69	3419
QU03	11	3.23	1.99	2166
QU03	12	3.17	2.76	3052
QU03	13	2.13	1.55	3657
QU03	14	3.38	2.84	3561
QU03	15	2.85	2.51	2786
SE108	16	2.34	1.46	3045
SE108	17	2.68	0.48	1702
SW16	18	2.91	2.38	2123
SW16	19	2.86	2.34	2756
SW52	20	2.98	2.63	2883
WM048	21	3.04	2.25	2107
WM052-S18	22	3.00	2.54	1180
WM055-S3	23	3.43	2.99	2789
WM055-S3	24	3.49	2.67	3362
WM055_S3	25	3.44	2.78	3014
WM055-S3-	26	3.40	2.34	2414
WM055-S3-	27	3.43	2.55	1694
WM056-S11	28	3.36	3.07	2355
WM056-S11	29	3.12	2.63	2251
WM056-S6	30	3.07	2.20	2015
WM056-S6	31	3.23	3.18	3271
WM056-S6	32	3.08	2.93	2645
WM056-S6	33	2.98	1.56	996
WM056-S6	34	3.35	2.38	1902
WM056-S6	35	3.28	2.27	2604
WM056-S6	36	2.98	2.05	1652
WM056-S6	37	3.15	2.79	1790
WS09	38	3.26	2.29	4381
WS09	39	3.50	3.10	2176
WS2E	40	3.21	2.71	4820
Min - Mean – Max		**2.13 3.11 3.51**	**0.48 2.39 3.18**	**2528**

5.1.7 Comparison of Key Understorey Findings with Forest Control Plots

One hundred and seventy-nine native and 7 introduced plant species were recorded, all introduced species are annual species that establish after seasonal rains.

No threatened flora pursuant to the BC Act 2016 and as listed by the DBCA (2026b), or pursuant to the EPBC Act 1999 and listed by the DCCEEW (2026) within the forest monitoring plots in 2025.

Hibbertia ambita P1 was recorded in the Mt Saddleback forest monitoring plot (FMP114) and *Stylidium marradongense* P3 was recorded in the Mt Saddleback forest monitoring plots (FMP108, FMP110 and FMP114) in 2025.

The results from the assessment of 8 forest plots in Mt Saddleback, Marradong and Quindanning areas are summarized in Tables 12a and 12b. These results reflect a similar range of native species on the rehabilitation areas (34 to 51) when compared with the control forest plots (mostly 44 to 72). In contrast the range of introduced species on the rehabilitation areas is higher than on the control plots, and the trend of introduced species decreases with increasing age of the rehabilitation areas. The latter pattern of introduced species reflects the lower range of introduced species in the less disturbed forest areas.

Table 12a: Summary of mean native and introduced species richness (alive and dead per 80 m²) of Rehabilitation areas and Forest Control Plots monitored in 2025

(Note: PP – Private Property areas)

Age in years (rehabilitation year)	Mean Species Richness per 80 m²	
	Native	Introduced
1 (2024)	51.03 ± 1.75	6.77 ± 0.62
5 (2020)	50.00 ± 6.10	4.67 ± 2.03
10 (2015)	47.00 ± 2.89	3.33 ± 0.76
20 (2005)	49.50 ± 3.27	1.33 ± 0.37
30 (1995)	34.33 ± 3.99 (35.60 ± 4.63 if PP areas excluded)	2.50 ± 1.74 (1.00 ± 0.55 if PP areas excluded)
Forest Control Plots and Site-Vegetation Type (2025 data)		
FMP091 – ST/19JSd	45	2
FMP108 – H/19JPs	65	0
FMP110 – P/19JLc	60	1
FMP112 – ST/19JSd	47	0
FMP114 – S/19JBg	65	0
MMP08A-V2 – P/19JLc	72	6
QMP01 – P/19JLc	44	0
QMP02 – H1/19jPS1	45	2
Overall Mean	55.38 ± 4.00	1.38 ± 0.73

The results for the plant densities and foliage cover are summarized in Table 12b. The densities tend to be generally lower on the rehabilitation areas, although the foliage covers on the older rehabilitation areas are relatively comparable to those in the forest control areas.

The densities and foliage cover of introduced species are generally lower on the forest control areas. The latter in part reflects the type of introduced species that are mainly short-lived species that spread into the disturbed rehabilitation areas.

Table 12b: Summary of mean alive and dead native plant density (per m² ± s.e.) and native foliage cover (%) of Rehabilitation areas monitored in 2025
(Note: PP – Private Property areas)

Age	Mean Native Plant Density		Mean Native % Foliage Cover ± s.e.	
	No. Plants/m² ± s.e.			
	Alive	Dead	Alive	Dead
1 (2024)	6.56 ± 0.14	0.38 ± 0.05	9.56 ± 1.28	0.03 ± 0.01
5 (2020)	5.30 ± 0.31	0.23 ± 0.06	37.62 ± 2.44	2.64 ± 0.69
10 (2015)	5.70 ± 0.51	0.48 ± 0.05	40.51 ± 2.11	12.39 ± 1.39
20 (2005)	5.12 ± 0.49	0.54 ± 0.08	39.88 ± 3.08	15.28 ± 2.13
30 (1995)	6.16 ± 0.39 (6.99 ± 0.42 if PP areas excluded)	0.49 ± 0.05 (0.58 ± 0.06 if PP areas excluded)	32.94 ± 2.18 (36.58 ± 2.35 if PP areas excluded)	5.85 ± 0.90 (6.17 ± 1.01 if PP areas excluded)
Forest Control Plots and Site-Vegetation Type (2025 data)				
FMP091 – ST/19JSd	6.09 ± 0.06	0.19 ± 0.01	42.48 ± 1.31	4.34 ± 0.52
FMP108 – H/19JPs	15.61 ± 0.09	0.38 ± 0.02	22.26 ± 0.59	0.31 ± 0.04
FMP110 – P/19JLc	13.53 ± 0.07	0.04 ± 0.001	11.51 ± 0.41	0.31 ± 0.03
FMP112 – ST/19JSd	7.19 ± 0.06	0.10 ± 0.005	14.55 ± 0.38	0.16 ± 0.02
FMP114 – S/19JBg	13.51 ± 0.06	0.29 ± 0.01	31.61 ± 1.10	2.84 ± 0.24
MMP08A-V2 – P/19JLc	15.01 ± 0.11	0.09 ± 0.003	9.76 ± 0.28	0.67 ± 0.04
QMP01 – P/19JLc	9.96 ± 0.05	0.14 ± 0.005	21.17 ± 0.42	1.73 ± 0.23
QMP02 – H1/19jPS1	15.01± 0.07	0.09 ± 0.003	17.08 ± 0.42	0.19 ± 0.02
Overall Mean	11.99 ± 0.42	0.16 ± 0.04	21.30 ± 1.58	1.32 ± 0.42

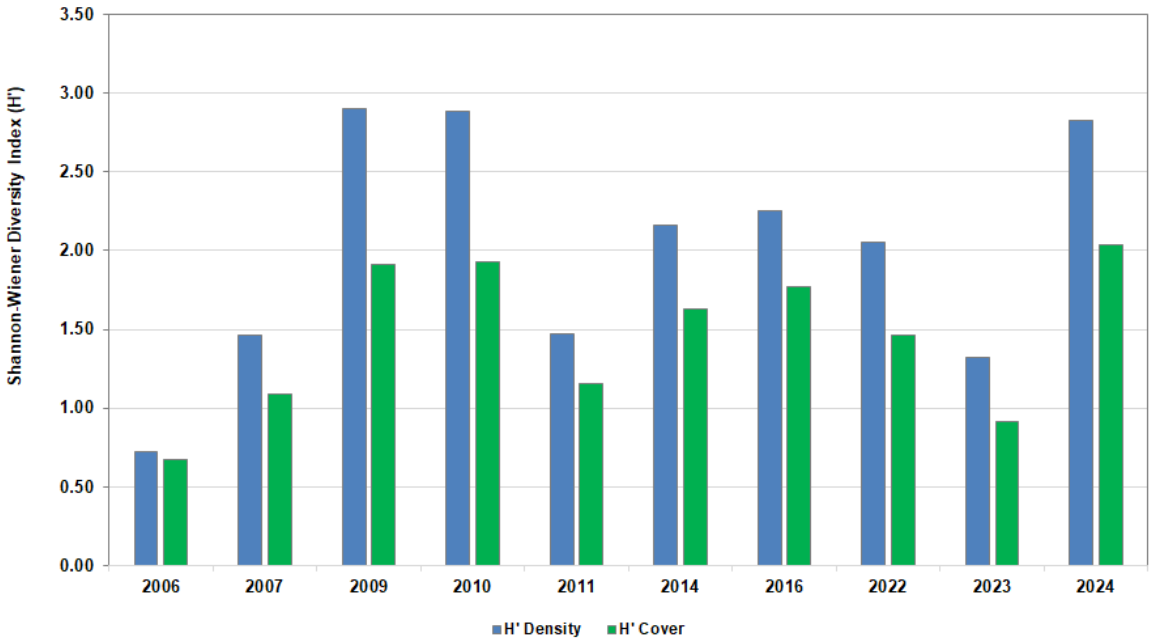


Figure 7a: Summary of Shannon – Wiener Diversity Indices over time on Forest Control Plots (note some caution is needed as not same plots recorded each year).

The Shannon –Wiener Diversity Indices (H') values for both density and foliage cover as assessed in 2025 for the forest control plots were amongst the highest when compared with previous assessments on control areas, Figure 7a.`

The Hierarchical Richness Index (HRI) as assessed in 2025 for the forest control plots was similar to the mid-range values when compared with previous assessments on control areas, Figure 7b.

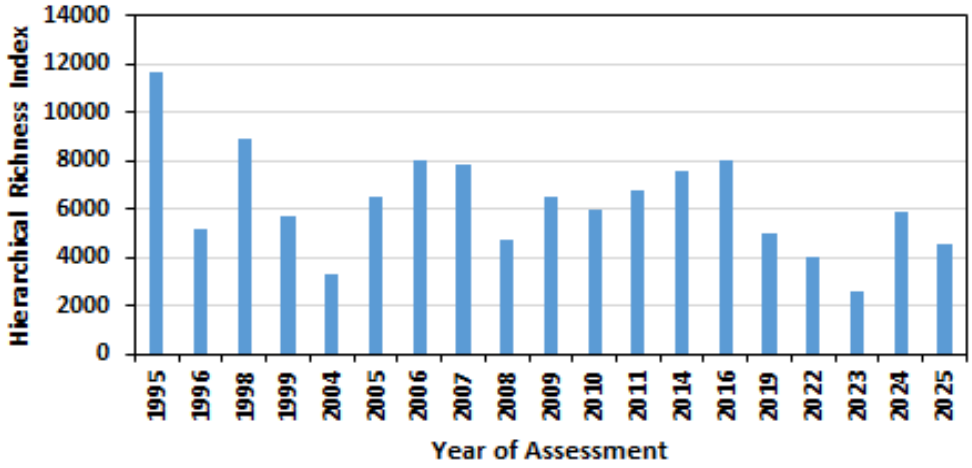


Figure 7b: **Summary of Heirarchial Richness Indices over time on Forest Control Plots** (note: some caution is needed as not same plots recorded each year).

5.1.8 Species Abundance and Frequency

In 2025, the dominant native species in the 2024 rehabilitation areas include *Eucalyptus marginata, Acacia celastrifolia, Bossiaea ornata, Petrophile heterophylla, Gastrolobium bilobum, Acacia pulchella, Acacia drummondii* subsp*. candolleana, Calothamnus* species, *Acacia lateriticola, Trymalium ledifolium, Bossiaea eriocarpa, Kennedia prostrata, Kennedia coccinea, Ptilotus polystachyus, Acacia drummondii* subsp*. drummondii, Banksia squarrosa* and *Hypocalymma angustifolium*. The most abundant introduced species were **Hypochaeris glabra*, **Ursinia anthemoides, *Vulpia myuros,* **Aira caryophyllea, *Petrorhagia dubia, *Lysmachia arvensis* and **Arctotheca calendula;* all of which were recorded in higher abundance in the younger rehabilitation areas, Appendix C. The majority of the introduced species are in very low abundance in the forest areas around Boddington. In the older rehabilitation areas the introduced species tend to reduce in abundance as the native species establish and proliferate in the first 5 to 10 years.

5.2 Trees

5.2.1 Fulfilment of Draft Completion Criteria

Rehabilitation from 2024 (15-month age group) mean Eucalypt (*Eucalyptus* species and *Corymbia calophylla*) tree density occurs within the range of the KPI indicator (Table 13a).

Table 13a: Summary of mean tree density within 2024 Rehabilitation areas at 15 months against set Key Performance Indicators (KPIs)

Eucalypt species = *E. accedens*, *E. marginata*, *E. patens*, *E. rudis*, *E. wandoo* and *Corymbia calophylla.*

Rehabilitation Location	Trees	Mean Density (Trees per ha ± s.e.)			KPI (Trees per ha)	Indicator Met
State Forest	Total	675.00	±	130.33	500 – 700	Yes
	Eucalyptus only	600.00	±	121.4	500 – 700	Yes

Overall, rehabilitation from each age group (30, 20, 10 and 5 years) largely satisfied minimum standards as outlined in the draft completion criteria (Table 13b). The only variation to the later was the need to include the standard error in the overall results for *Corymbia calophylla* and *Eucalyptus marginata* to enable the change from Fail to Pass for these two tree species, Table 13b. According to draft completion criteria guidelines if a rehabilitation year has failed to meet minimum tree per ha density requirements, it must undergo an assessment of richness (Table 12d). One of the rehabilitation areas failed to satisfy minimum standards for total trees (Table 13c). If only *Corymbia calophylla*, Eucalypt species and *Allocasuarina fraseriana* are included in Timber Production values then all plots except two plots in 2020 passed the criteria. If the trees only include *Corymbia calophylla* and *Eucalyptus marginata* then one plot in the 1995 areas, two plots in the 2015 areas and four plots in the 2020 areas failed the criteria (Table 13c).

Table 13b: Summary of rehabilitation at 30, 20, 10 and 5 years old assessed against draft completion criteria in 2025

Year of Establishment	Target	Sustainable overstorey	Timber production	*Corymbia calophylla* and *Eucalyptus marginata* only
1995	≥200 trees/ ha	PASS	PASS	PASS
2005	≥200 trees/ ha	PASS	PASS	PASS
2015	≥200 trees/ ha	PASS	PASS	PASS
2020	≥200 trees/ ha	PASS	PASS	FAIL **

Note: All targets are based on trees per ha, excluding seedlings (<130 cm in height) ; ** 2020 areas pass criteria if SE (standard error) is taken into account.

Table 13c: Summary of mature tree densities (excluding seedlings) at 30, 20, 10 and 5 years old by pit assessed against draft completion criteria in 2025

Mean Alive Trees include all tree species; ^ Timber production trees include *Allocasuarina fraseriana* and all *Corymbia* and *Eucalyptus* species but excluded *Allocasuarina huegeliana, Banksia grandis* and *Persoonia longifolia;* ** 2020 areas pass criteria if SE (standard error) is taken into account.

Year	Pit	Plot	Mean alive trees/ha	PASS /FAIL	Mean alive timber production trees/ha^	PASS /FAIL	Mean alive *Corymbia calophylla* and *Eucalyptus marginata* trees/ha^	PASS /FAIL
1995	FAW	MP09	800	PASS	800	PASS	650	PASS
	N10(A)	MP03	1625	PASS	1325	PASS	1325	PASS
	NE02	MP07	275	PASS	275	PASS	150	FAIL
	NE05	MP08	1000	PASS	1000	PASS	825	PASS
	SE02	MP10	750	PASS	675	PASS	650	PASS
	SE02	MP11	625	PASS	600	PASS	475	PASS
	Overall		**845.83 ± 184.10**	**PASS**	**779.17 ± 146.55**	**PASS**	**615 ± 180.03**	**PASS**
2005	NSS	MP01	475	PASS	400	PASS	375	PASS
	N10.6	MP02	625	PASS	450	PASS	250	PASS
	N18	MP06	625	PASS	525	PASS	425	PASS
	SW01	MP10	725	PASS	650	PASS	525	PASS
	SE13	MP12	725	PASS	625	PASS	425	PASS
	SE	MP15	1425	PASS	1425	PASS	1375	PASS
	Overall		**775.00 ± 81.98**	**PASS**	**679.17 ± 92.58**	**PASS**	**562.50 ± 166.5**	**PASS**
2015	ME03-22	MP03	900	PASS	275	PASS	200	PASS
	MN34/10-V2	MP07-V2	775	PASS	250	PASS	175	FAIL
	SW21	MP11	1325	PASS	1225	PASS	675	PASS
	SW35	MP14	475	PASS	475	PASS	350	PASS
	SW47	MP15	225	PASS	225	PASS	175	FAIL
	WS08	MP20	500	PASS	500	PASS	350	PASS
	Overall		**700.00 ± 21.95**	**PASS**	**491.67 ± 21.39**	**PASS**	**320.83 ± 78.37**	**PASS**
2020	ME12	MP07	325	PASS	175	PASS	75	FAIL
	MNE35	MP05	425	PASS	300	PASS	300	PASS
	MS09	MP15	275	PASS	75	FAIL	50	FAIL
	SW107	MP25	100	FAIL	75	FAIL	50	FAIL
	WM052	MP33	300	PASS	300	PASS	50	FAIL
	WM056	MP28	900	PASS	525	FAIL	375	PASS
	Overall		**387.50 ± 23.97**	**PASS**	**241.67 ± 15.09**	**PASS**	**150.00 ± 60.21**	**FAIL ******

A comparison of numbers of trees and seedlings on the forest control plots reflects the complexity and diversity of results in the forest areas (Tables 13d and 13e), The differences in numbers and dominance of the Sheoak (*Allocasuarina fraseriana), Banksia grandis* and the different Eucalypts in part reflects the inherent differences in the site-vegetation types that occur on these respective plots and areas. The numbers of alive trees (Table 13d), with the exception of two forest control plots (FMP108 and MMP08A – V2)) exceed the average 330 trees/hectare that was recorded in earlier studies on the main forest site-vegetation types (Worsley Alumina Pty Ltd 1985).

Table 13d: Summary of mature tree densities (excluding seedlings) on Forest Control Plots in 2025

Mean Alive Trees include all tree species; ^ Timber production trees include *Allocasuarina fraseriana* and all *Corymbia* and *Eucalyptus* species but excluded *Allocasuarina huegeliana, Banksia grandis* and *Persoonia longifolia*

Area	Plot	Mean alive trees/ha	Mean alive timber production trees/ha^	Mean alive *Corymbia calophylla* and *Eucalyptus marginata* trees/ha^
Mt Saddleback	FMP091 – ST/19JSd	550	400	400
	FMP108 – H/19JPs	225	150	150
	FMP110 – P/19JLc	1025	975	950
	FMP112 – ST/19JSd	1200	925	800
	FMP114 – S/19JBg	375	325	325
Marradong	MMP08A-V2 – P/19JLc	325	325	200
Quindanning	QMP01 – P/19JLc	675	675	275
	QMP02 – H1/19JPs	1025	1025	625

Table 13e: Summary of seedling tree densities on Forest Control Plots in 2025

Mean Alive Trees include all tree species; ^ Timber production trees include *Allocasuarina fraseriana* and all *Corymbia* and *Eucalyptus* species but excluded *Allocasuarina huegeliana, Banksia grandis* and *Persoonia longifolia*

Area	Plot	Mean alive tree seedlings/ha	Mean alive timber production tree seedlings/ha^	Mean alive *Corymbia calophylla* and *Eucalyptus marginata* Trees seedlings/ha^
Mt Saddleback	FMP091 – ST/19JSd	875	750	750
	FMP108 – H/19JPs	0	0	0
	FMP110 – P/19JLc	525	525	50
	FMP112 – ST/19JSd	75	25	0
	FMP114 – S/19JBg	275	0	0
Marradong	MMP08A-V2 – P/19JLc	825	825	825
Quindanning	QMP01 – P/19JLc	175	125	25
	QMP02 – H1/19JPs	400	400	175

5.2.2 Tree Density

Mean density values of alive seedlings and trees recorded within rehabilitation and control areas monitored at the BBM during 2025 are presented in Figures 8a to 8k. Some of the variation over time is related to the shifts in the availability of plots for monitoring as density values vary between plots. The 2024 rehabilitation areas supported the highest alive mean seedling density overall (including *Allocasuarina huegeliana* and *Banksia grandis*) of any age of rehabilitation monitored in 2025 with 1829.2 seedlings/ha, whilst the 1994 and 2005 rehabilitation areas had the lowest alive mean seedling density (including *Allocasuarina huegeliana* and *Banksia grandis*) with 29.2 seedlings/ha. Overall, mean alive seedling density generally decreased with increasing age of rehabilitation (Figures 8a, 8c, 8e, 8g).

Within the 1995 rehabilitation areas, the alive mean seedling density of total species varied largely between assessment years, but there was a reduction in seedling densities from the initial assessment in 1996. *Eucalyptus marginata* and *Allocasuarina fraseriana* were the dominant tree species recorded through the majority of monitoring years (Figures 7a and 7b).

The total alive seedling density within the 2005 rehabilitation monitored in 2025 was 29.2 seedlings/ha (Figure 8c). *Eucalyptus marginata, Banksia grandis* and *Corymbia calophylla* were the dominant tree species recorded in 2025 (Figures 8c and 8d).

During the 2025 monitoring survey the 2015 rehabilitation area recorded a total seedling density of 45.8 seedlings/ha (Figure 8e). Dominant tree species within 2015 rehabilitation areas for most monitoring years was *Eucalyptus marginata, Allocasuarina fraseriana* and *Banksia grandis* (Figure 8e and 8f).

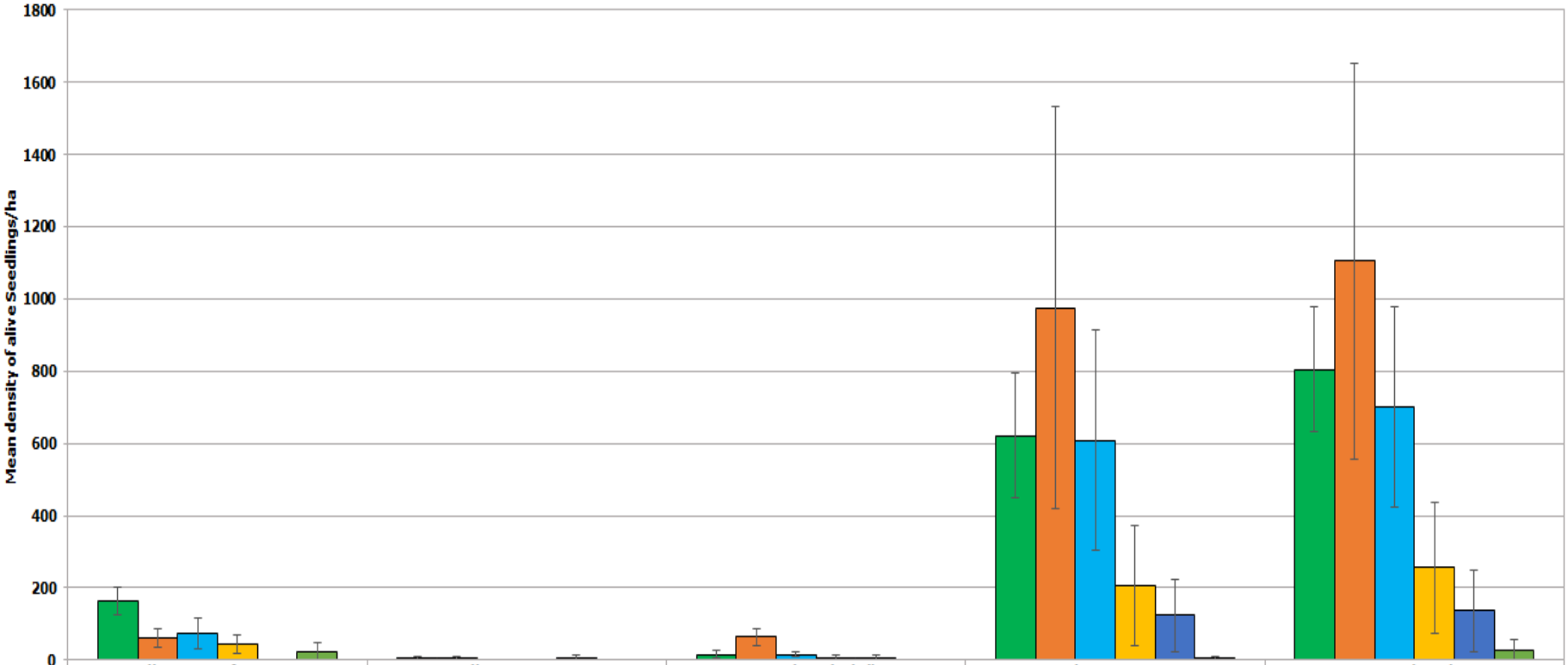
The total alive seedling density within the 2020 rehabilitation monitored in 2025 was 845.8 seedlings/ha. *Eucalyptus marginata* and *Banksia grandis* seedlings were the dominant tree species recorded during the 2025 monitoring (Figure 8g).

Density of seedlings (including *Banksia grandis*) recorded within the 2024 rehabilitation plots was 1829.2/ha at 15 months is presented in Figure 8i. *Eucalyptus marginata* and *Banksia grandis* were the dominant tree species in the 2024 plots. *Corymbia calophylla* seedlings were low in 2024 areas (Figure 8i).

Across all rehabilitation years, mean alive tree density varied with age. In general rehabilitation areas appear to go through a boom-and-bust cycle, where tree density increases initially and then begins to decline after a certain age (somewhere between 15 – 20 years since rehabilitation; Figure 8b, 8d, and 8f).

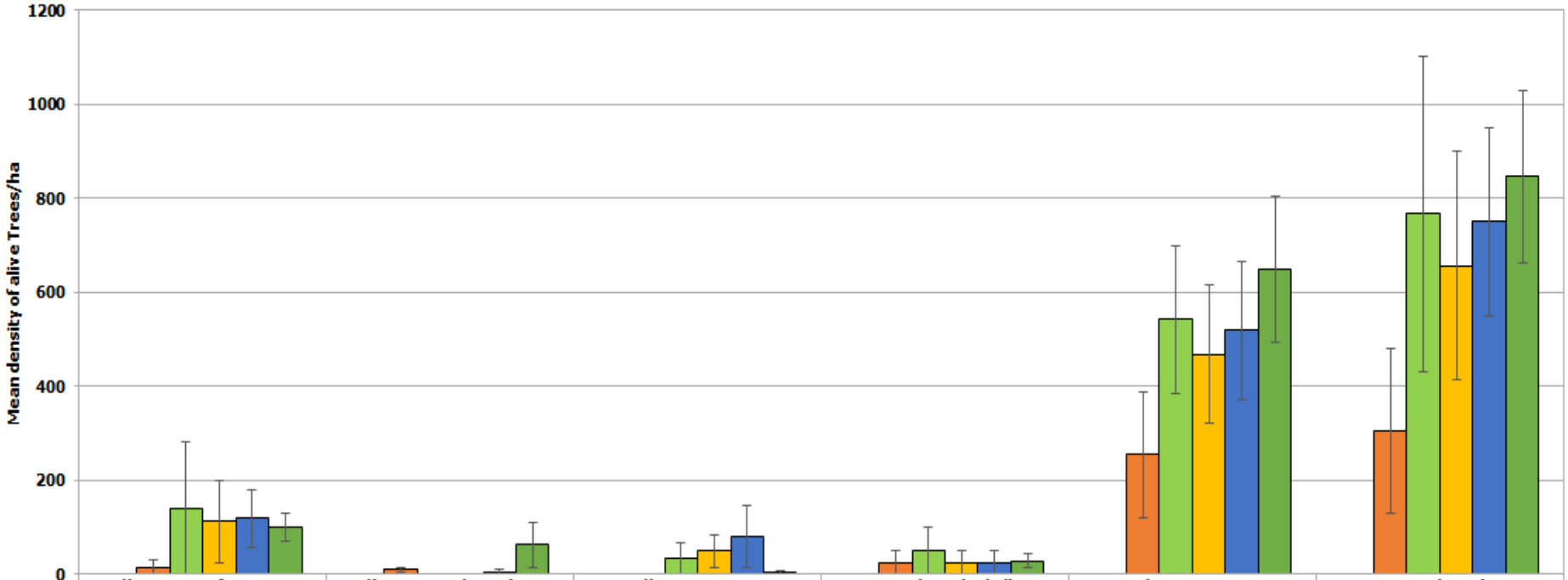
Dominant tree species varied greatly within each rehabilitation year, but generally over time and in different ages of rehabilitation *Eucalyptus marginata* was the dominant tree species, (Figures 8a to 8i). *Allocasuarina* species and *Banksia grandis* typically occurred in most of the rehabilitation ages.

The tree and seedling numbers on the forest control plots is summarised in Figures 8j and 8k. These results reflect the dominance of the *Eucalyptus marginata.* There is variation between species on the different plots which also reflects the underlying differences in site-vegetation types and local conditions, with *Banksia grandis* and *Allocasuarina fraseriana* fluctuating in numbers on some of the site-vegetation types (Tabled 13d and 13e).



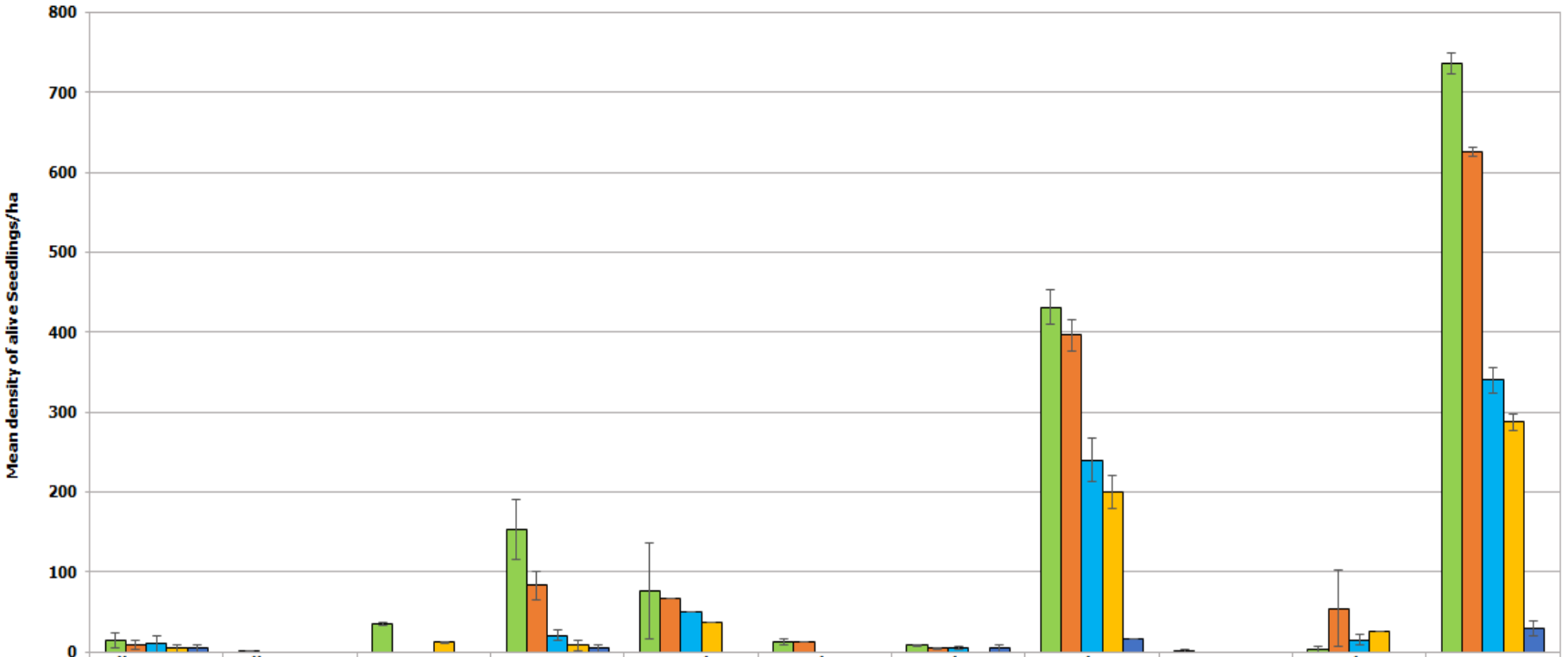
	Allocasuarina fraseriana	Allocasuarina sp.	Corymbia calophylla	Eucalyptus marginata	Grand Total
1996	162.5	4.2	16.7	620.8	804.2
1999	60.0	5.0	65.0	975.0	1105.0
2005	75.0	0.0	16.7	608.3	700.0
2010	43.8	0.0	6.3	206.3	256.3
2015	0.0	6.3	6.3	125.0	137.5
2025	25.0	0.0	0.0	4.2	29.2

Figure 8a: **Mean density (± se) of alive seedlings (<130 cm in height) in areas rehabilitated in 1995 from assessments in 1996, 1999, 2005, 2010, 2015 and 2025**



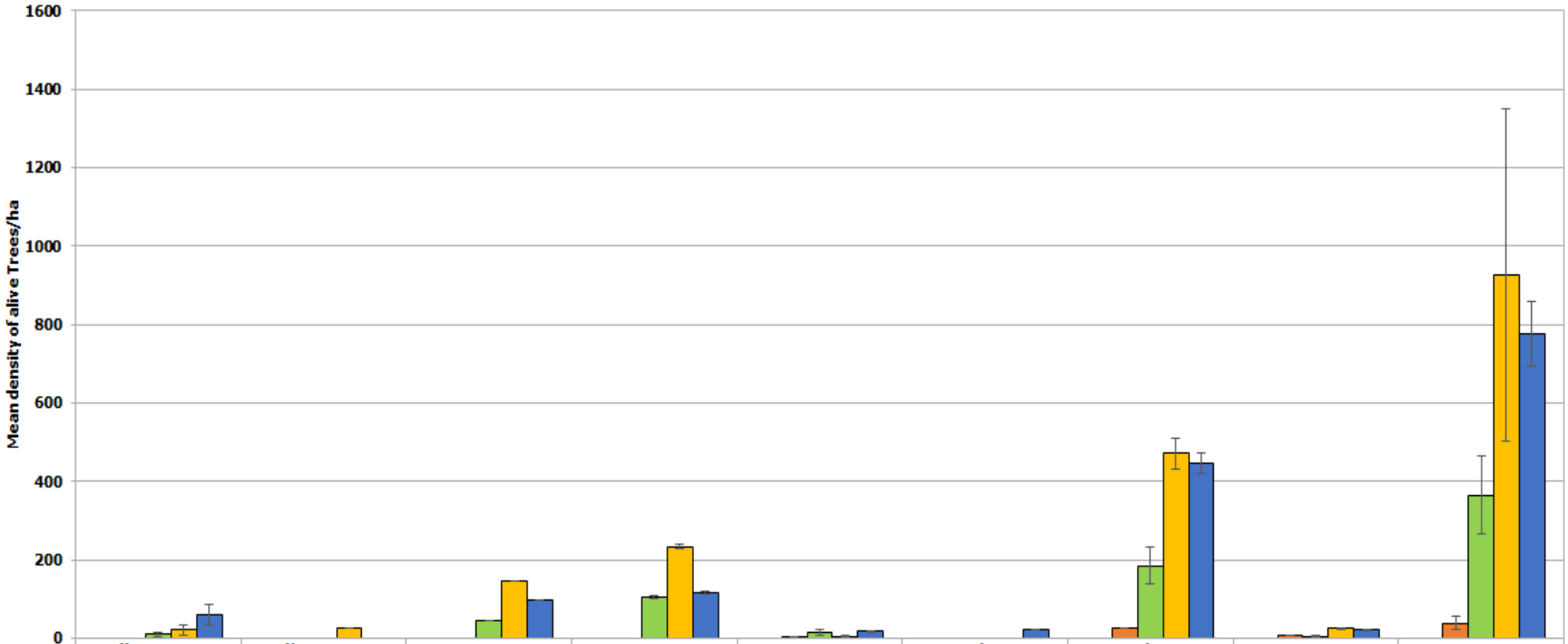
	Allocasuarina fraseriana	Allocasuarina huegeliana	Allocasuarina sp.	Corymbia calophylla	Eucalyptus marginata	Grand Total
1996	0.0	0.0	0.0	0.0	0.0	0.0
1999	15.0	10.0	0.0	25.0	255.0	305.0
2005	141.7	0.0	33.3	50.0	541.7	766.7
2010	112.5	0.0	50.0	25.0	468.8	656.3
2015	118.8	6.3	81.3	25.0	518.8	750.0
2025	100.0	62.5	4.2	29.2	650.0	845.8

Figure 8b: **Mean density (± se) of alive trees (≥130 cm in height) in areas rehabilitated in 1995, from assessments in 1996, 1999, 2005, 2010, 2015 and 2025**



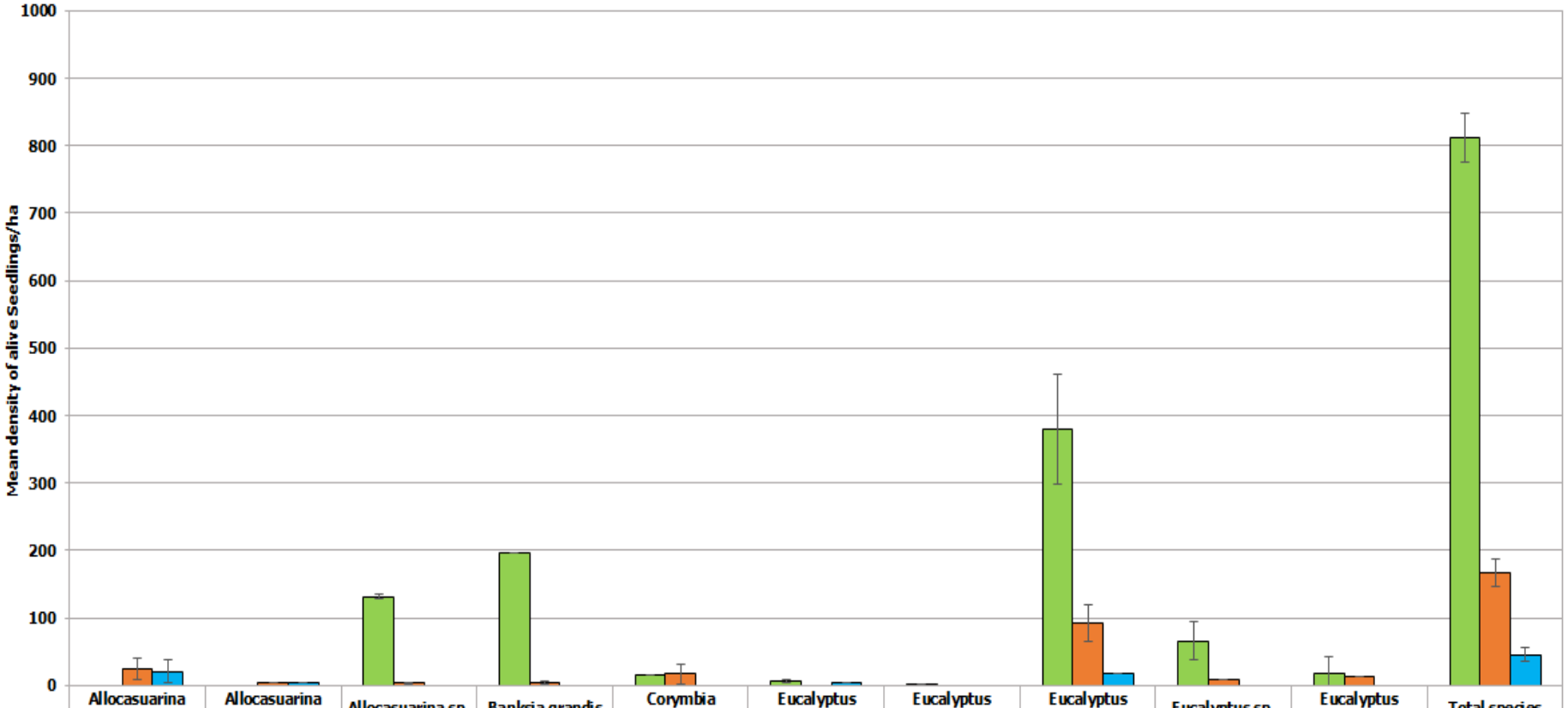
	Allocasuarina fraseriana	Allocasuarina huegeliana	Allocasuarina sp.	Banksia grandis	Corymbia calophylla	Eucalyptus accedens	Eucalyptus drummondii	Eucalyptus marginata	Eucalyptus sp.	Eucalyptus wandoo	Grand Total
2006	14.1	1.6	34.4	153.1	76.6	12.5	7.8	431.3	1.6	3.1	735.9
2009	8.3	0.0	0.0	83.3	66.7	12.5	4.2	395.8	0.0	54.2	625.0
2012	10.0	0.0	0.0	20.0	50.0	0.0	5.0	240.0	0.0	15.0	340.0
2015	4.2	0.0	12.5	8.3	37.5	0.0	0.0	200.0	0.0	25.0	287.5
2025	4.2	0.0	0.0	4.2	0.0	0.0	4.2	16.7	0.0	0.0	29.2

Figure 8c: **Mean density (± se) of alive seedlings (<130 cm in height) in areas rehabilitated in 2005, from assessments in 2006, 2009, 2012, 2015 and 2025**



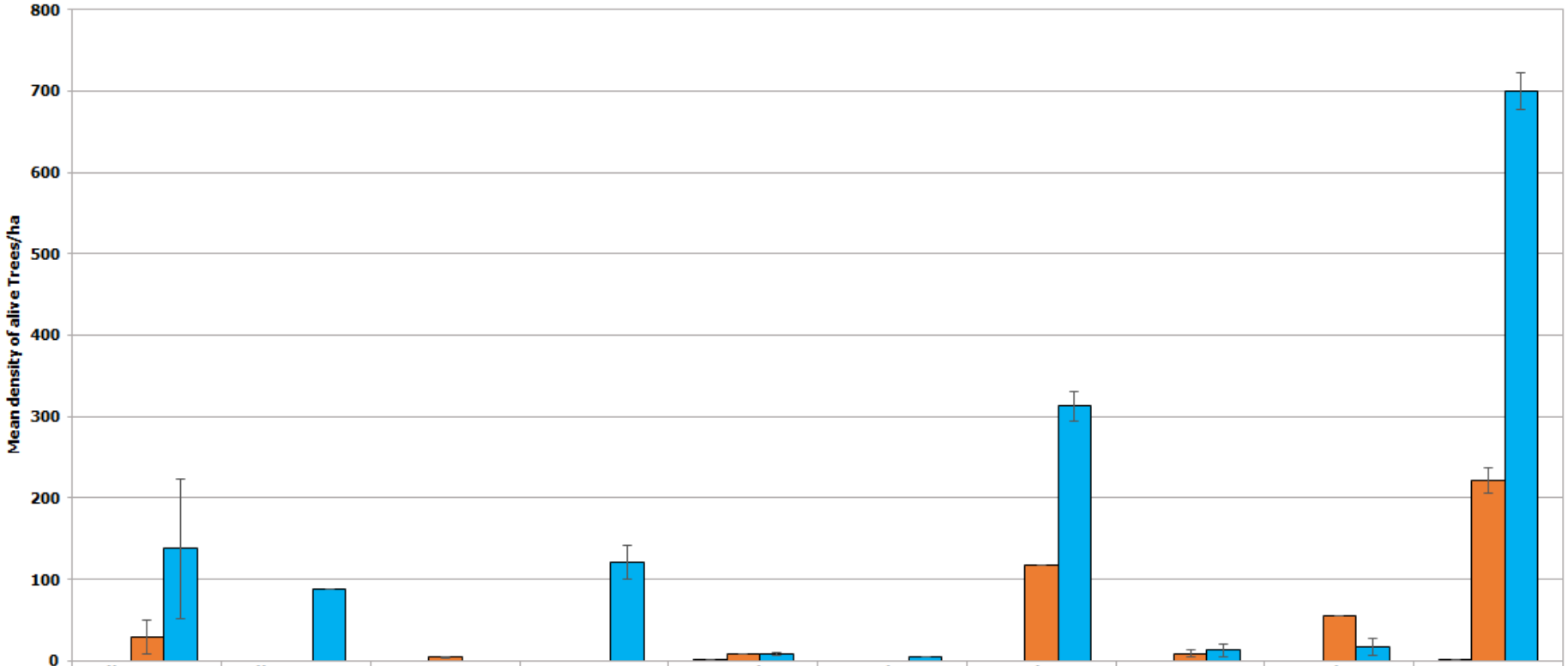
	Allocasuarina fraseriana	Allocasuarina huegeliana	Banksia grandis	Corymbia calophylla	Eucalyptus accedens	Eucalyptus drummondii	Eucalyptus marginata	Eucalyptus wandoo	Total species
2006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2009	0.0	0.0	0.0	0.0	4.2	0.0	25.0	8.3	37.5
2012	10.0	0.0	45.0	105.0	15.0	0.0	185.0	5.0	365.0
2015	20.8	25.0	145.8	233.3	4.2	0.0	470.8	25.0	925.0
2025	58.3	0.0	95.8	116.7	16.7	20.8	445.8	20.8	775.0

Figure 8d: Mean density (± se) of alive trees (≥130 cm in height) in areas rehabilitated in 2005, from assessments in 2006, 2009, 2012, 2015 and 2025



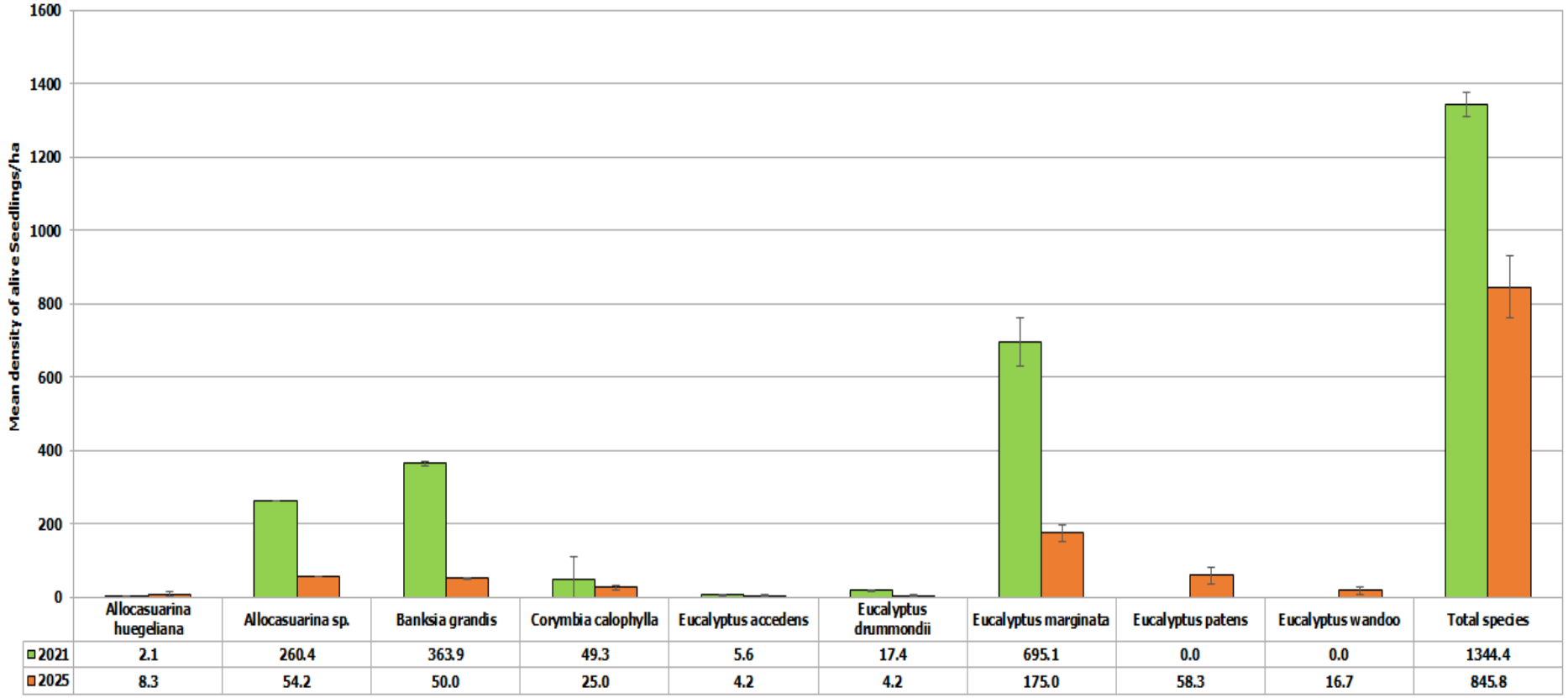
	Allocasuarina fraseriana	Allocasuarina huegeliana	Allocasuarina sp.	Banksia grandis	Corymbia calophylla	Eucalyptus accedens	Eucalyptus drummondii	Eucalyptus marginata	Eucalyptus sp.	Eucalyptus wandoo	Total species
2016	0.0	0.0	131.0	196.4	14.3	6.0	1.2	379.8	65.5	17.9	811.9
2020	25.0	4.2	4.2	4.2	16.7	0.0	0.0	91.7	8.3	12.5	166.7
2025	20.8	4.2	0.0	0.0	0.0	4.2	0.0	16.7	0.0	0.0	45.8

Figure 8e: Mean density (± se) of alive seedlings (<130 cm in height) in areas rehabilitated in 2015, from assessments in 2016, 2020 and 2025



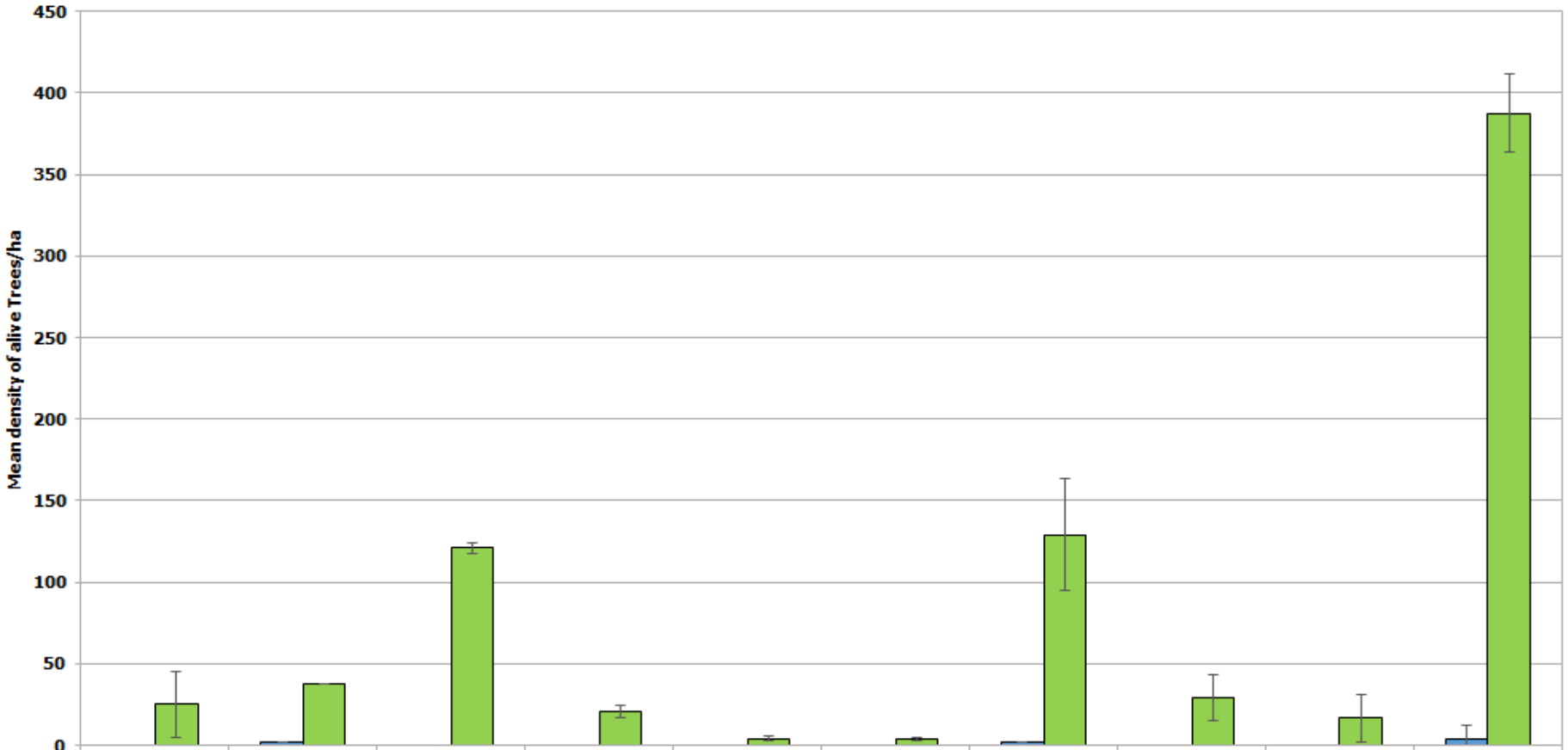
	Allocasuarina fraseriana	Allocasuarina huegeliana	Allocasuarina sp.	Banksia grandis	Corymbia calophylla	Eucalyptus accedens	Eucalyptus marginata	Eucalyptus patens	Eucalyptus wandoo	Total species
2016	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	1.2
2020	29.2	0.0	4.2	0.0	8.3	0.0	116.7	8.3	54.2	220.8
2025	137.5	87.5	0.0	120.8	8.3	4.2	312.5	12.5	16.7	700.0

Figure 8f: Mean density (± se) of alive trees (≥130 cm in height) in areas rehabilitated in 2015, from assessments in 2016, 2020 and 2025



	Allocasuarina huegeliana	Allocasuarina sp.	Banksia grandis	Corymbia calophylla	Eucalyptus accedens	Eucalyptus drummondii	Eucalyptus marginata	Eucalyptus patens	Eucalyptus wandoo	Total species
2021	2.1	260.4	363.9	49.3	5.6	17.4	695.1	0.0	0.0	1344.4
2025	8.3	54.2	50.0	25.0	4.2	4.2	175.0	58.3	16.7	845.8

Figure 8g: Mean density (± se) of alive seedlings (<130 cm in height) in areas rehabilitated in 2020, from assessments in 2021 and 2025



	Allocasuarina huegeliana	Allocasuarina sp.	Banksia grandis	Corymbia calophylla	Eucalyptus accedens	Eucalyptus drummondii	Eucalyptus marginata	Eucalyptus patens	Eucalyptus wandoo	Total species
2021	0.0	2.2	0.0	0.0	0.0	0.0	1.5	0.0	0.0	3.7
2025	25.0	37.5	120.8	20.8	4.2	4.2	129.2	29.2	16.7	387.5

Figure 8h: **Mean density (± se) of alive trees (≥130 cm in height) per species recorded for the 2020 rehabilitation plots, from assessment in 2021 and 2025**

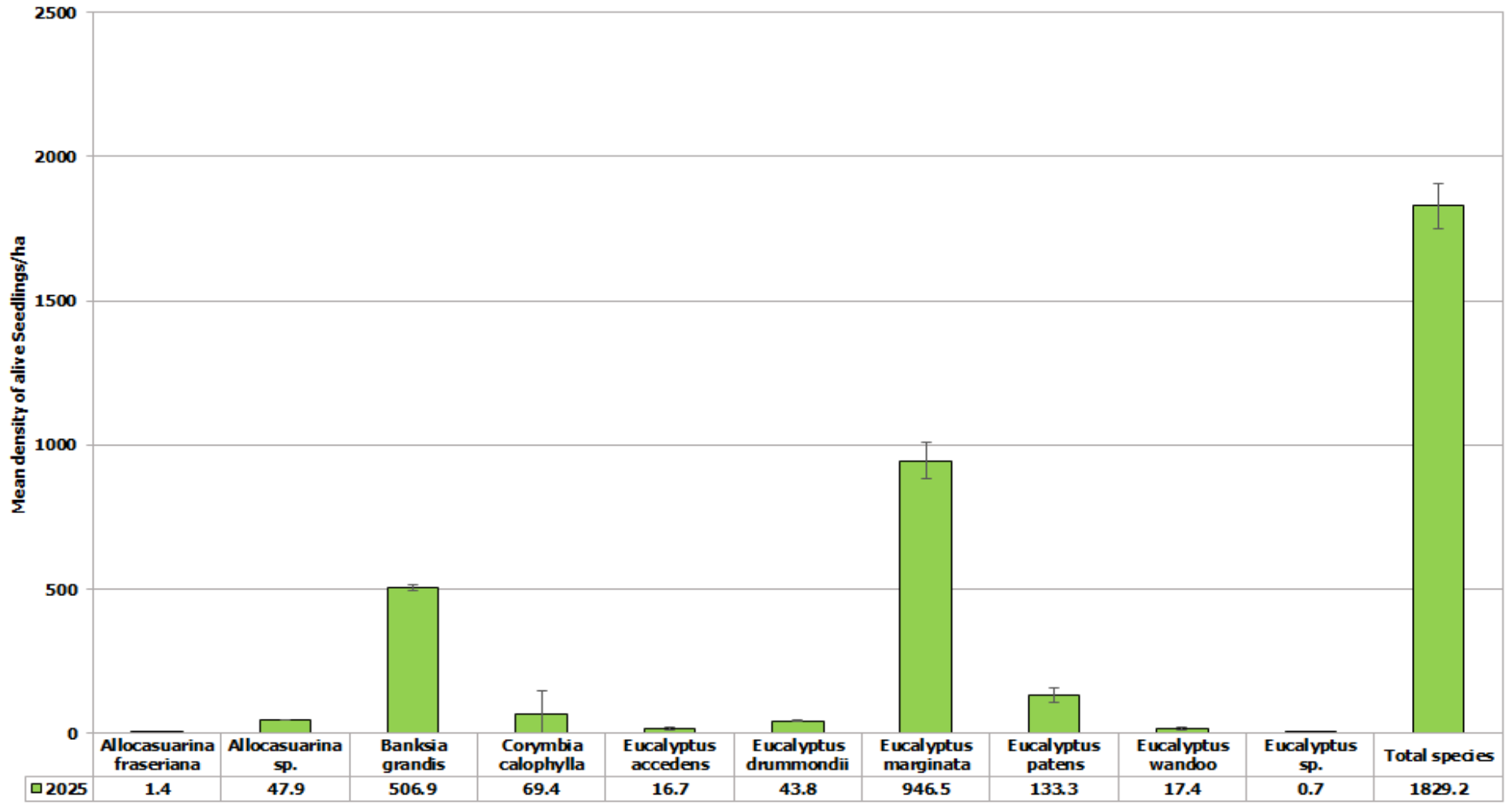
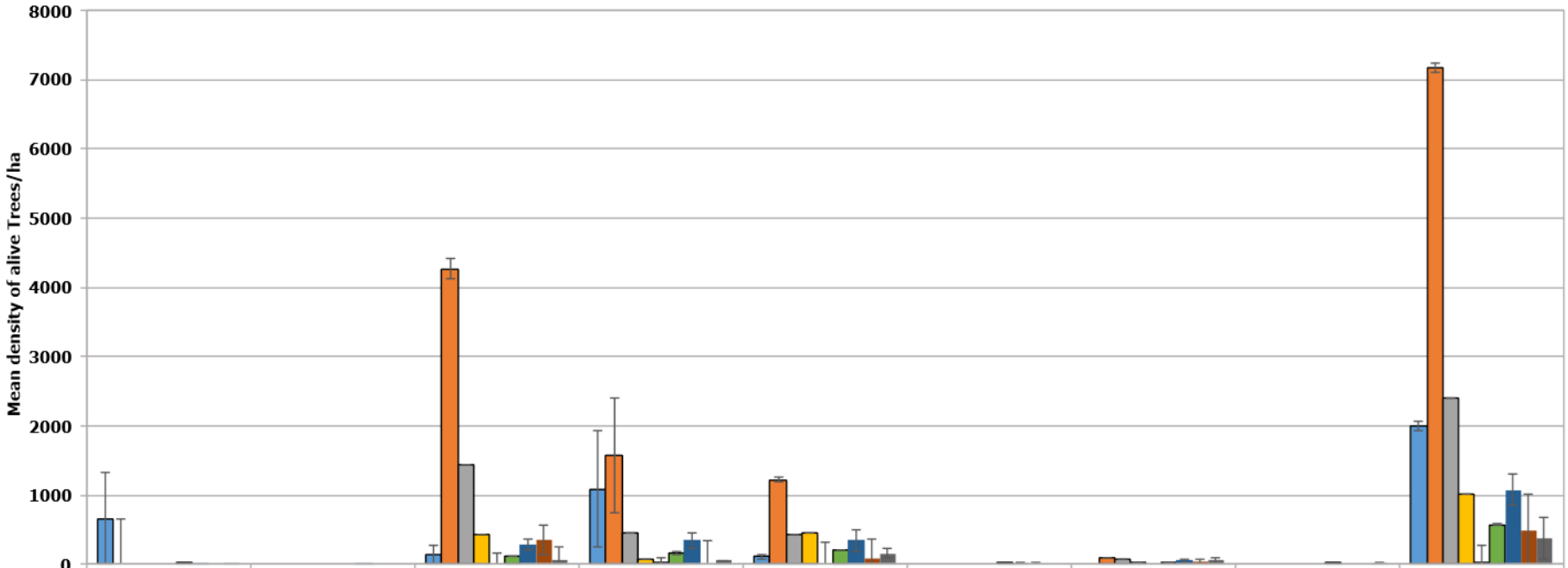
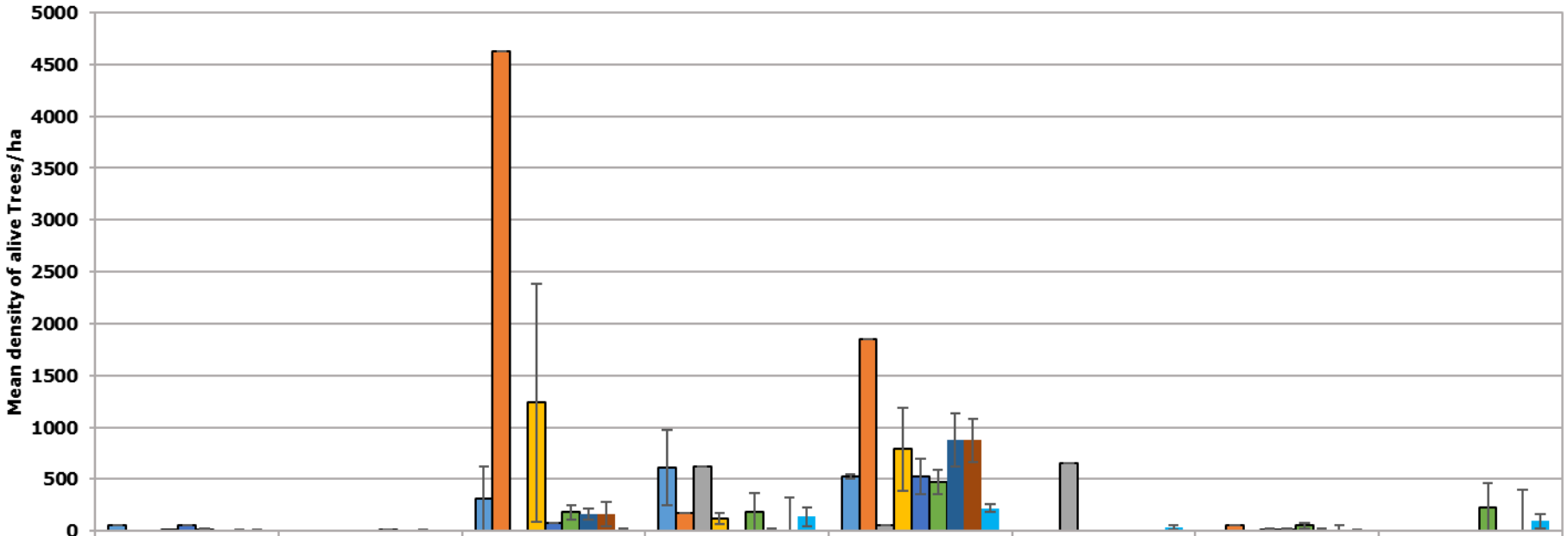


Figure 8i: Mean density of alive seedlings and trees (No./ha) per species recorded for the 2024 rehabilitation plots during the 2025 assessment



	Allocasuarina fraseriana	Allocasuarina sp.	Banksia grandis	Corymbia calophylla	Eucalyptus marginata	Eucalyptus sp.	Persoonia longifolia	Santalum acuminatum	Total species
1998	662.5	0.0	137.5	1087.5	112.5	0.0	0.0	0.0	2000.0
1999	0.0	0.0	4275.0	1575.0	1225.0	0.0	100.0	0.0	7175.0
2002	0.0	0.0	1450.0	450.0	425.0	0.0	75.0	0.0	2400.0
2016	0.0	0.0	437.5	87.5	456.3	0.0	25.0	0.0	1006.3
2019	0.0	0.0	0.0	12.5	0.0	0.0	0.0	0.0	12.5
2022	4.2	0.0	129.2	166.7	212.5	16.7	37.5	4.2	570.8
2023	8.3	8.3	283.3	350.0	350.0	25.0	58.3	0.0	1083.3
2024	0.0	0.0	362.5	0.0	87.5	0.0	50.0	0.0	500.0
2025	15.6	0.0	59.4	62.5	162.5	0.0	59.4	28.1	387.5

Figure 8j: **Total density of alive seedlings (No./ha) per species recorded in the Forest Control Plots during the 1998, 1999, 2002, 2016, 2019, 2022, 2023, 2024 and 2025 assessments**



	Allocasuarina fraseriana	Banksia grandis	Corymbia calophylla	Eucalyptus marginata	Eucalyptus wandoo	Persoonia longifolia	Santalum acuminatum	Total species
1998	51	0	312.5	612.5	525	0	0	0
1999	0.0	0.0	4625.0	175.0	1850.0	0.0	50.0	0.0
2002	0.0	0.0	0.0	625.0	50.0	650.0	0.0	0.0
2016	5.0	0.0	1237.5	118.8	787.5	0.0	12.5	0.0
2019	51.0	0.0	75.0	0.0	525.0	0.0	12.5	0.0
2022	16.0	4.2	179.2	183.3	475.0	0.0	50.0	229.2
2023	6.0	0.0	162.5	0.0	875.0	0.0	12.5	0.0
2024	6.0	0.0	162.5	0.0	875.0	0.0	12.5	0.0
2025	10.0	0.0	12.5	137.5	218.8	31.3	12.5	93.8

Figure 8k: **Total density of alive trees (No./ha) per species recorded in the Forest Control Plots during the 1998, 1999, 2000, 2002, 2016, 2019, 2022, 2023, 2024 and 2025 assessment**

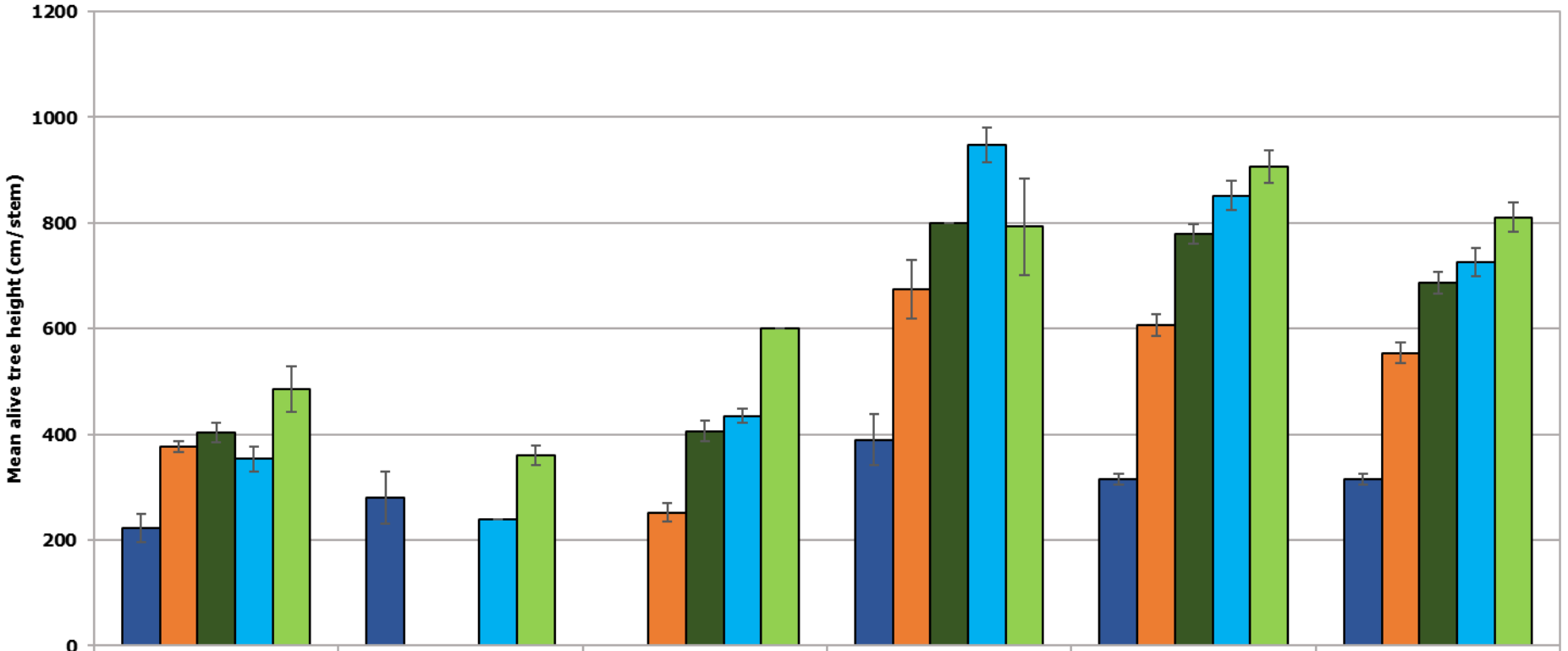
5.2.3 Tree Height and Diameter (by stem)

Mean tree height and diameter at breast height (DBH) recorded within rehabilitation and control areas monitored at BBM during 2025 are presented in Figures 9a to 9k. Results illustrate that there was a proportional relationship between tree age and height (especially in *Eucalyptus* species) within all of the rehabilitation areas monitored. The 1995 rehabilitation areas contained trees with the highest overall species mean tree height (810.9cm; Figure 9a) for the 2025 monitoring. For the larger tree species (*Eucalyptus marginata, Eucalyptus accedens* and *Eucalyptus wandoo)* there some variation in the increases in mean tree height with increasing age since rehabilitation (Figures 9a-9d).

In the current (2025) assessment, *Eucalyptus marginata* was the tallest tree species with a mean height of 906.5cm within the 1995 rehabilitation area (Figure 9a), *Eucalyptus accedens* with a mean height of 750cm was the tallest in the 2005 rehabilitation areas (Figure 9b), Eucalyptus accedens with a mean height of 500cm was the tallest in 2015 rehabilitation (Figure 9c), and *Eucalyptus wandoo* with a mean height of 330cm was the tallest tree species in the 2020 rehabilitation areas (Figure 9d). The heights of the trees on the older rehabilitation areas were more similar to those on the forest control plots (Figure 9f).

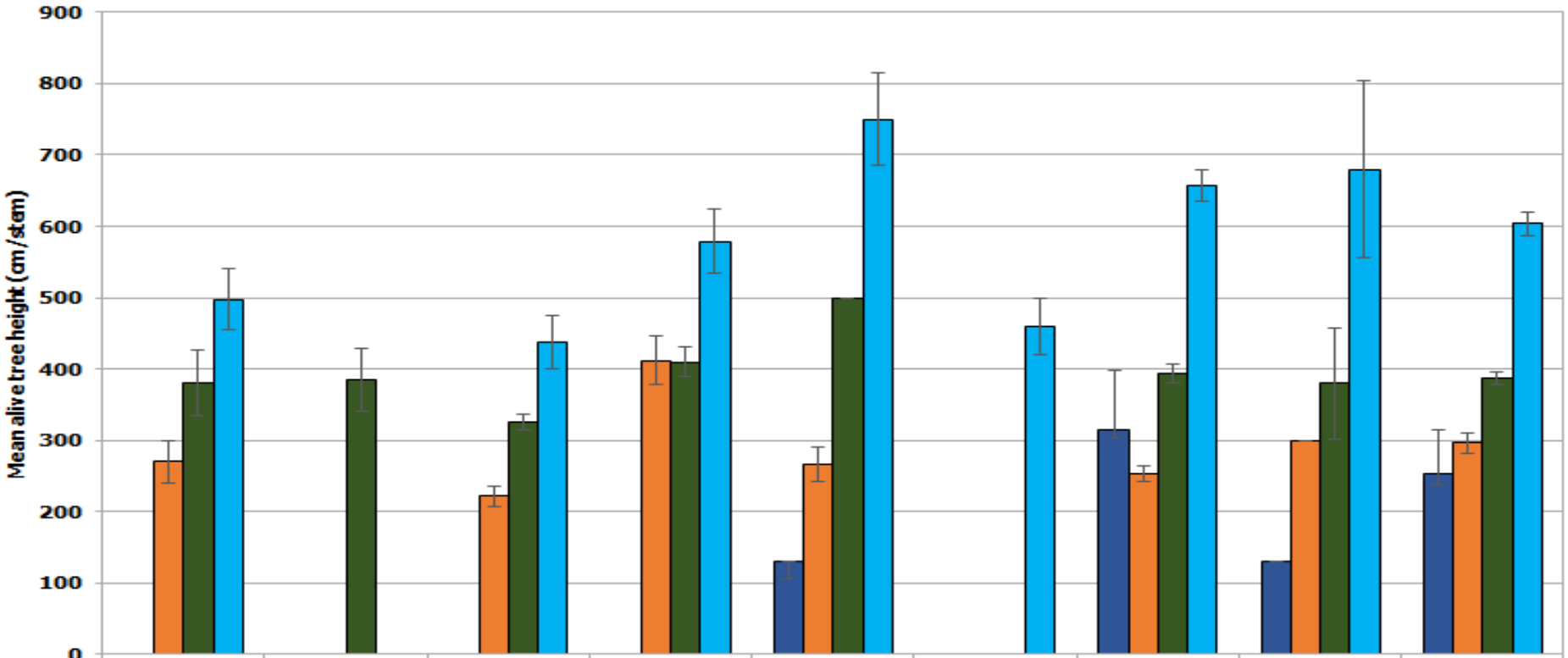
Mean tree DBH recorded within rehabilitation and control areas monitored at BBM also exhibit a proportional relationship with increasing age of rehabilitation across all areas monitored in 2025. As the rehabilitation gets older, the mean DBH of the total species increases (Figures 9g-9k).

The greatest mean DBH values recorded in 2025 were for *Eucalyptus marginata* within the 1995 rehabilitation areas (17.4cm; Figure 9g). In the 2005 rehabilitation areas, the greatest DBH values recorded in 2025 were 14.7cm for *Eucalyptus wandoo* (Figure 9h), in the 2015 rehabilitation areas the greatest mean of the DBH was 15cm for *Eucalyptus accedens* (Figure 9i), and for the 2020 rehabilitation areas *Eucalyptus drummondii* had the largest average DBH recorded in 2025, with 6.4cm (Figure 9j). The DBHs of the trees on the rehabilitation areas with exception of some trees on the 1995 areas remained lower than on the forest control plots (Figure 9k).



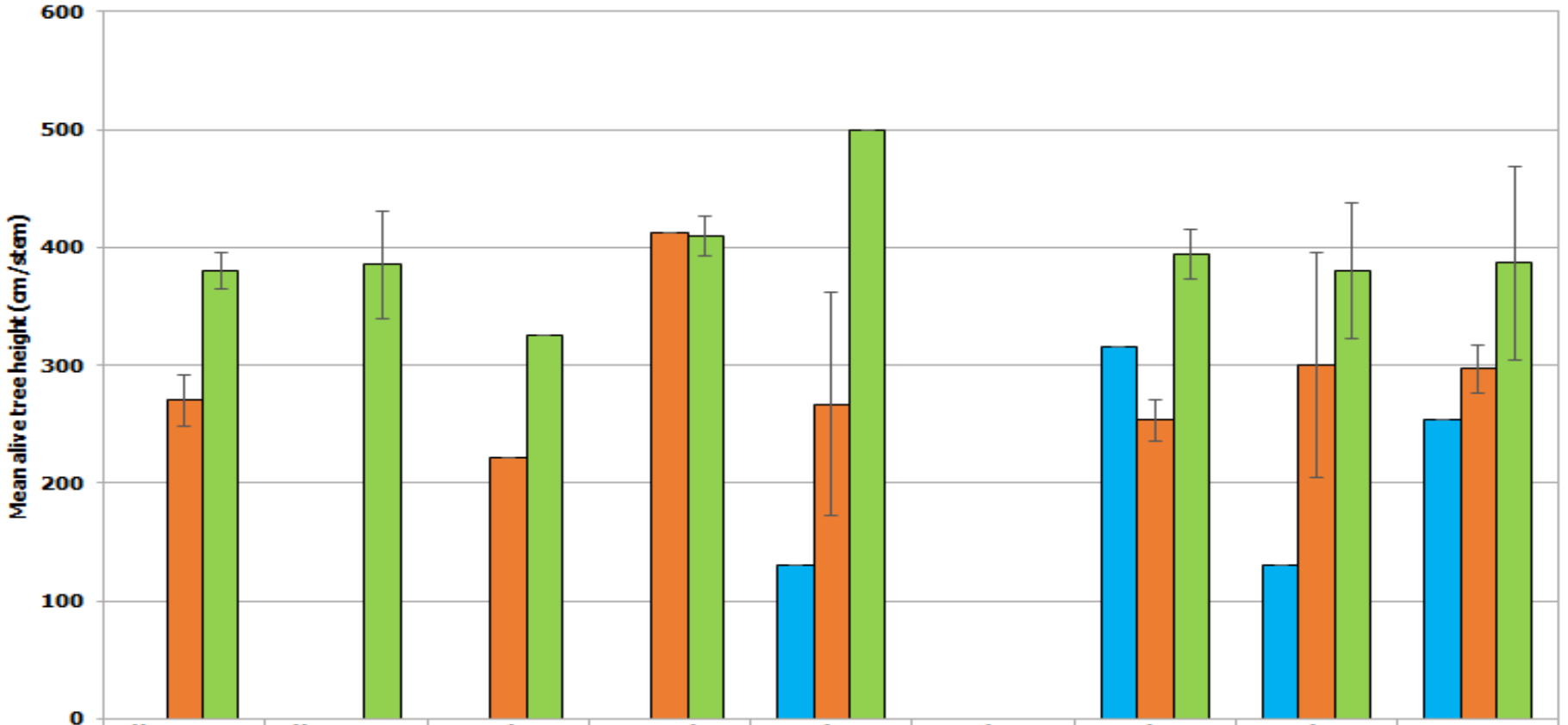
	Allocasuarina fraseriana	Allocasuarina huegeliana	Banksia grandis	Corymbia calophylla	Eucalyptus marginata	Grand Total
1999	223.3	280.0	0.0	390.0	315.1	315.6
2005	376.5	0.0	252.5	675.0	607.1	553.5
2010	402.8	0.0	406.3	800.0	778.9	686.9
2015	353.2	240.0	434.6	947.5	851.9	725.8
2025	485.4	360.0	600.0	792.9	906.5	810.9

Figure 9a: **Mean height (cm) of alive trees (all stems ≥130 cm in height) in areas rehabilitated in 1995, from assessments in 1999, 2005, 2010, 2015 and 2025**



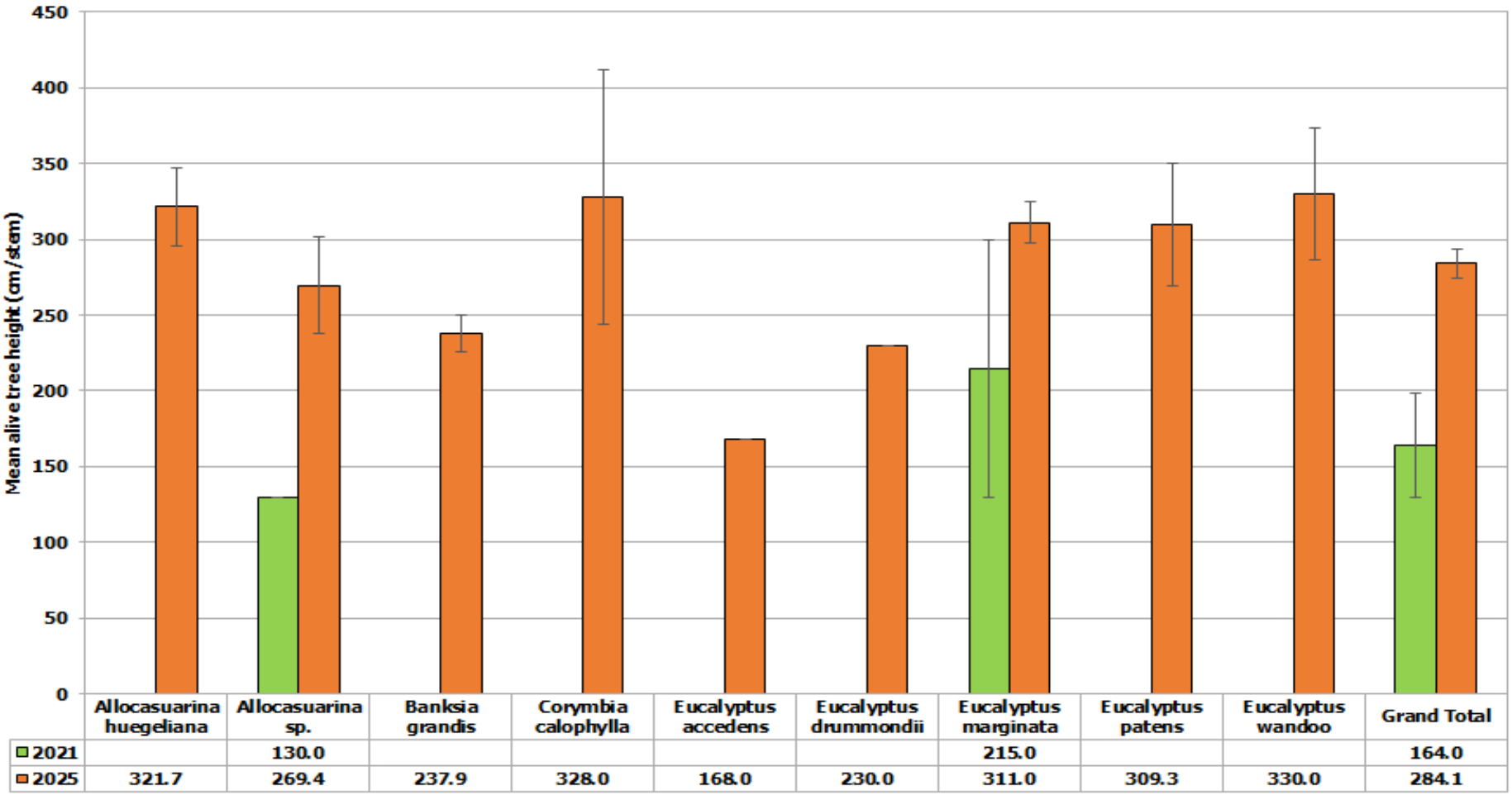
	Allocasuarina fraseriana	Allocasuarina huegeliana	Banksia grandis	Corymbia calophylla	Eucalyptus accedens	Eucalyptus drummondii	Eucalyptus marginata	Eucalyptus wandoo	Grand Total
2009					130.0		315.0	130.0	253.3
2012	270.0		221.7	411.9	266.7		253.1	300.0	296.6
2015	380.0	385.0	325.7	409.5	500.0		393.8	380.0	386.6
2025	497.9		437.0	578.6	750.0	460.0	657.6	680.0	603.7

Figure 9b: **Mean height (cm) of alive trees (all stems ≥130 cm in height) in areas rehabilitated in 2005, from assessments in 2009, 2012, 2015 and 2025**



	Allocasuarina fraseriana	Allocasuarina huegeliana	Banksia grandis	Corymbia calophylla	Eucalyptus accedens	Eucalyptus drummondii	Eucalyptus marginata	Eucalyptus wandoo	Grand Total
2016					130.0		315.0	130.0	253.3
2020	270.0		221.7	411.9	266.7		253.1	300.0	296.6
2025	380.0	385.0	325.7	409.5	500.0		393.8	380.0	386.6

Figure 9c: Mean height (cm) of alive trees (all stems ≥130 cm in height) in areas rehabilitated in 2015, following assessments in 2016, 2020 and 2025



	Allocasuarina huegeliana	Allocasuarina sp.	Banksia grandis	Corymbia calophylla	Eucalyptus accedens	Eucalyptus drummondii	Eucalyptus marginata	Eucalyptus patens	Eucalyptus wandoo	Grand Total
2021		130.0					215.0			164.0
2025	321.7	269.4	237.9	328.0	168.0	230.0	311.0	309.3	330.0	284.1

Figure 9d: Mean height (cm) of alive trees (all stems ≥130 cm in height) in areas rehabilitated in 2020, following assessments in 2021 and 2025

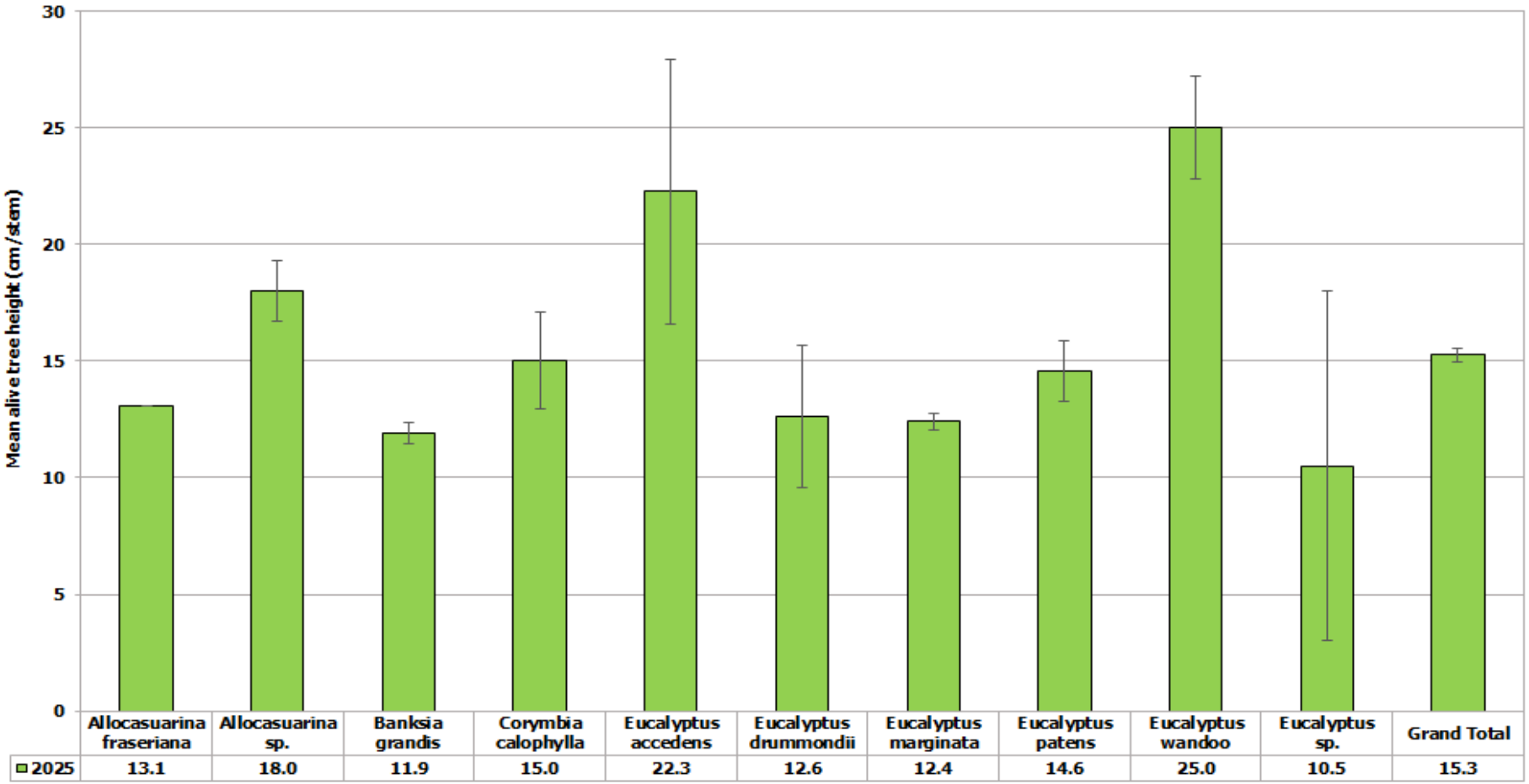
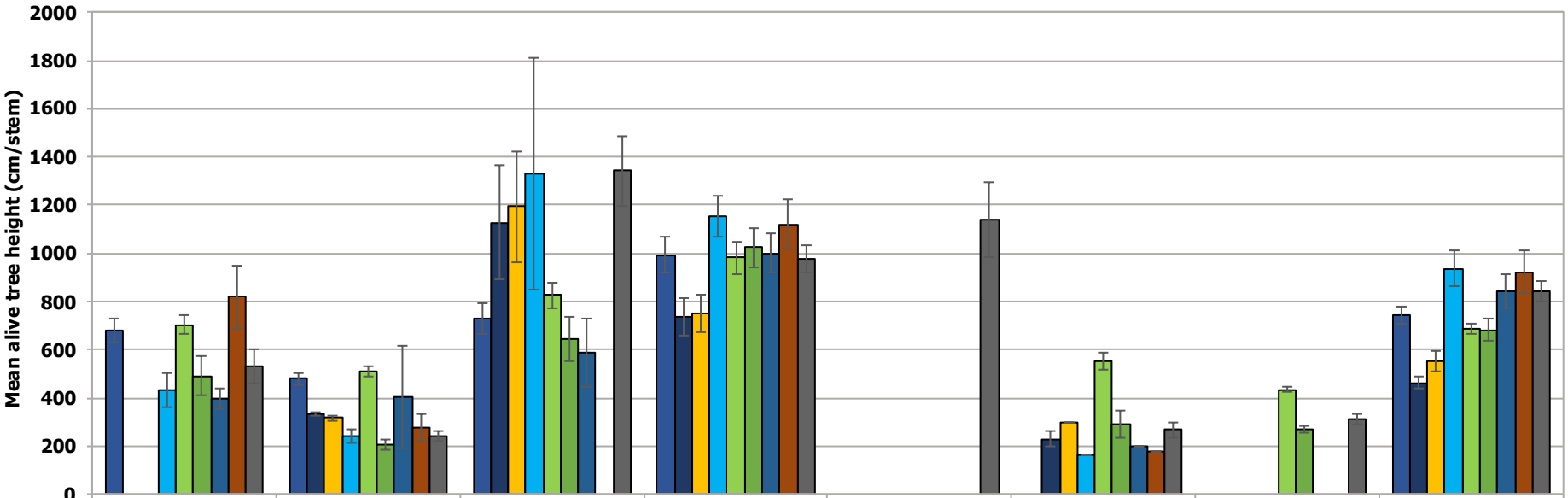
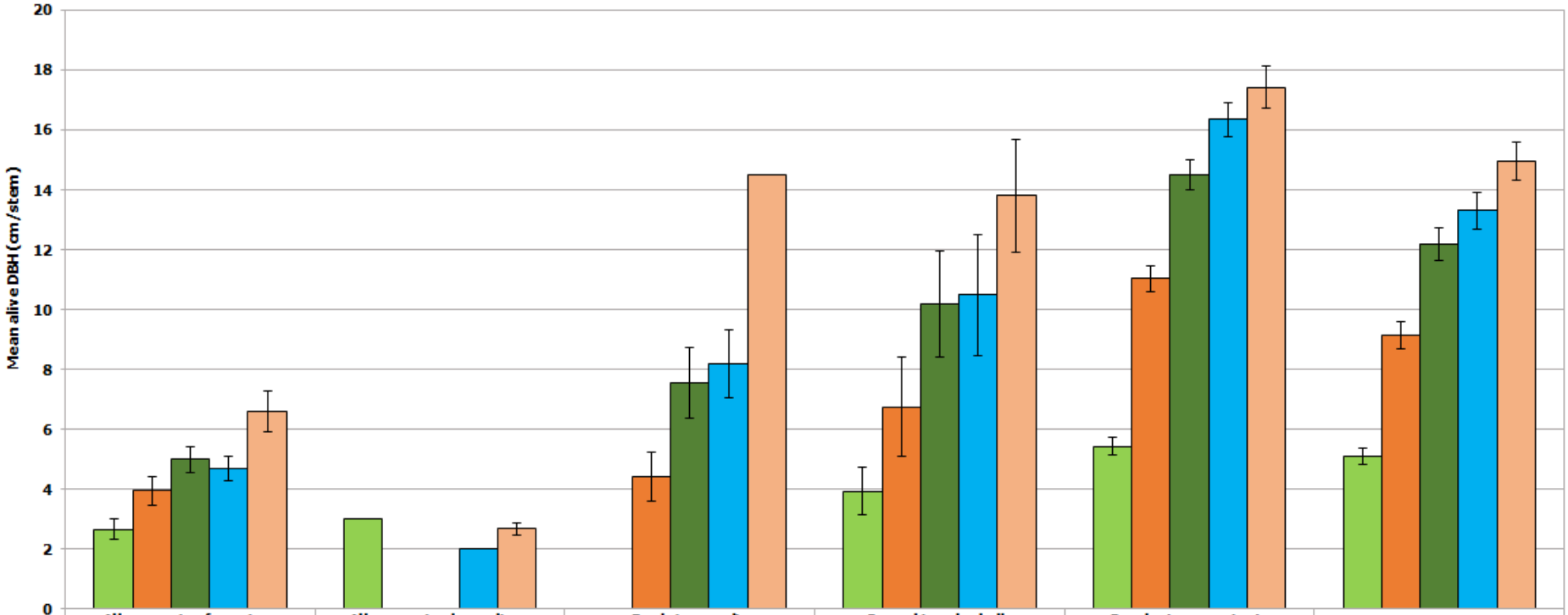


Figure 9e: Mean height (cm) of alive seedlings (all stems <130 cm in height) in areas rehabilitated in 2024, following assessments in 2025



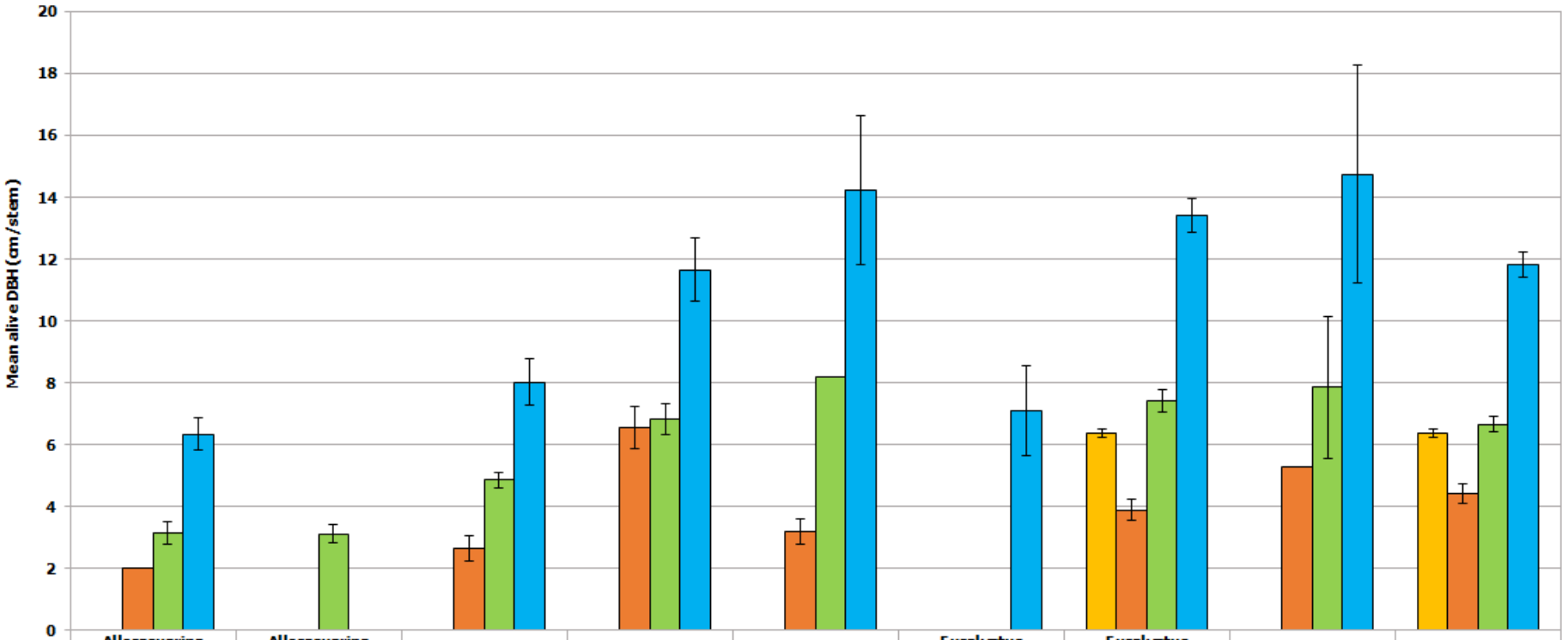
	Allocasuarina fraseriana	Banksia grandis	Corymbia calophylla	Eucalyptus marginata	Eucalyptus wandoo	Persoonia longifolia	Santalum acuminatum	Grand Total
1998	677.5	478.0	729.3	992.9	0.0	0.0	0.0	742.4
1999	0.0	332.1	1128.6	733.9	0.0	230.0	0.0	463.1
2002	0.0	315.4	1192.9	749.7	0.0	300.0	0.0	551.1
2016	430.0	240.0	1333.3	1153.6	0.0	160.0	0.0	936.8
2019	704.0	511.1	825.0	981.6	0.0	550.0	434.5	685.6
2022	490.4	203.3	644.8	1024.5	0.0	293.3	269.0	681.0
2023	396.0	403.3	590.0	1000.3	0.0	200.0	0.0	843.3
2024	818.3	276.7	0.0	1122.0	0.0	180.0	0.0	923.4
2025	531.0	241.8	1343.2	976.7	1140.0	266.7	313.3	841.9

Figure 9f: **Mean height (cm) of alive trees (all stems ≥130 cm in height) in Forest Control Plots in 1998, 1999, 2000, 2002, 2007, 2016, 2019, 2022, 2023, 2024 and 2025**



	Allocasuarina fraseriana	Allocasuarina huegeliana	Banksia grandis	Corymbia calophylla	Eucalyptus marginata	
1999	2.7	3.0	0.0	3.9	5.4	5.1
2005	4.0	0.0	4.4	6.8	11.0	9.2
2010	5.0	0.0	7.6	10.2	14.5	12.2
2015	4.7	2.0	8.2	10.5	16.3	13.3
2025	6.6	2.7	14.5	13.8	17.4	15.0

Figure 9g: **Mean DBH (cm) of alive trees (all stems ≥130 cm in height) in areas rehabilitated in 1995, following assessments in 1999, 2005, 2010, 2015 and 2025** Note: DBH values <2 cm were excluded from analysis.



	Allocasuarina fraseriana	Allocasuarina huegeliana	Banksia grandis	Corymbia calophylla	Eucalyptus accedens	Eucalyptus drummondii	Eucalyptus marginata	Eucalyptus wandoo	Total Species
2009							6.4		6.4
2012	2.0		2.6	6.6	3.2		3.9	5.3	4.4
2015	3.2	3.1	4.9	6.8	8.2		7.4	7.9	6.7
2025	6.3		8.0	11.7	14.2	7.1	13.4	14.7	11.8

Figure 9h: **Mean DBH (cm) of alive trees (all stems ≥130 cm in height) in areas rehabilitated in 2005, following assessments in 2009, 2012, 2015 and 2025** Note: DBH values <2 cm was excluded from analysis.

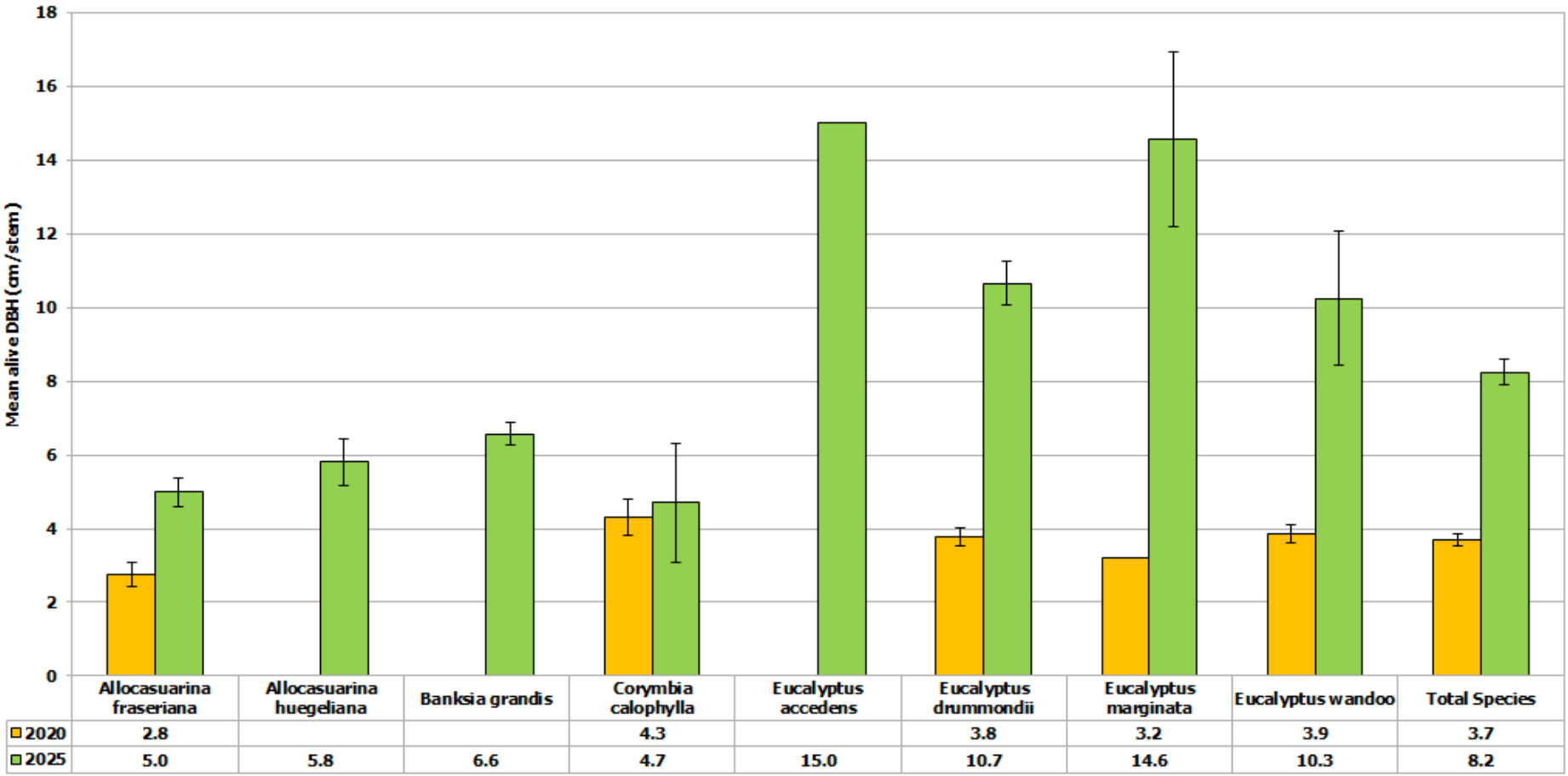
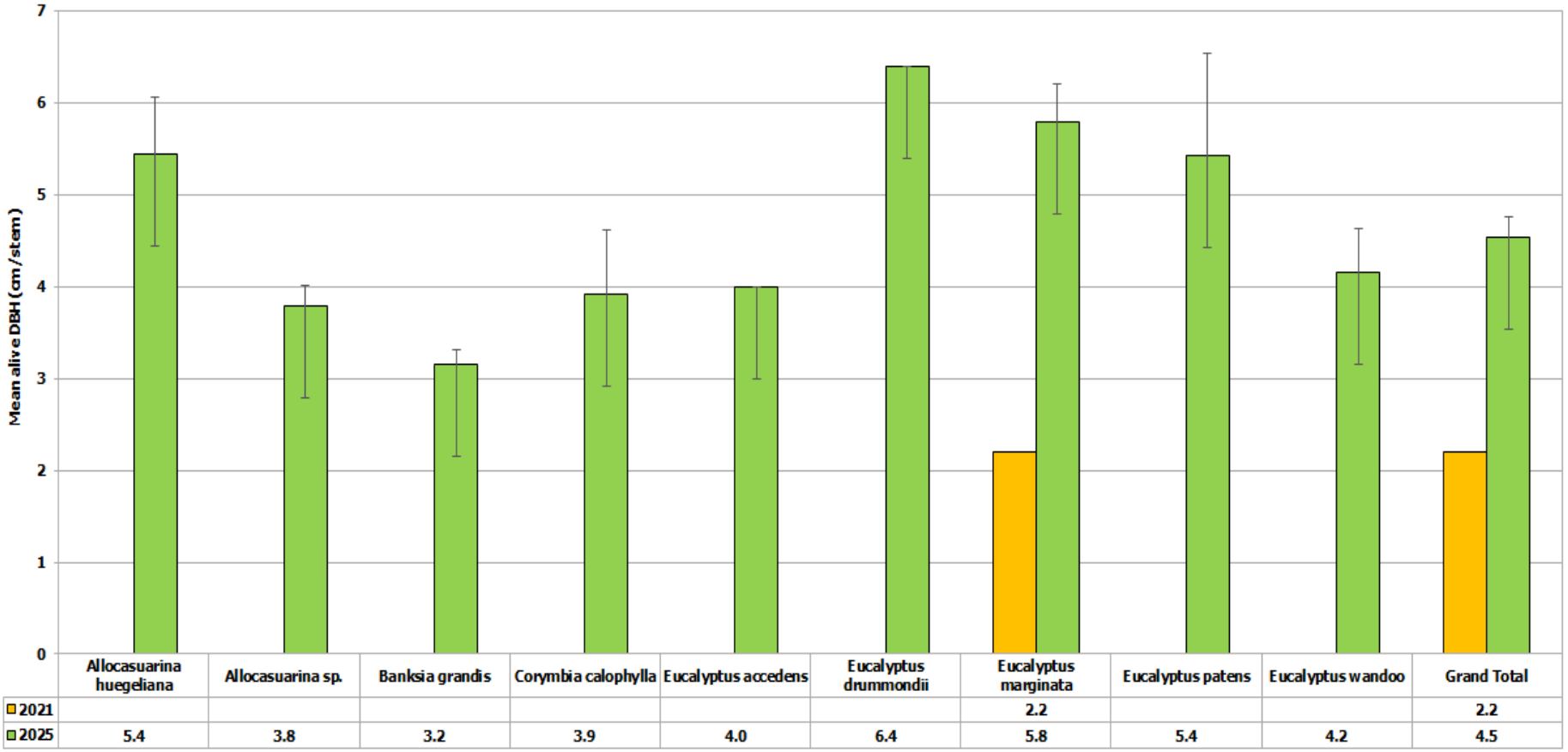
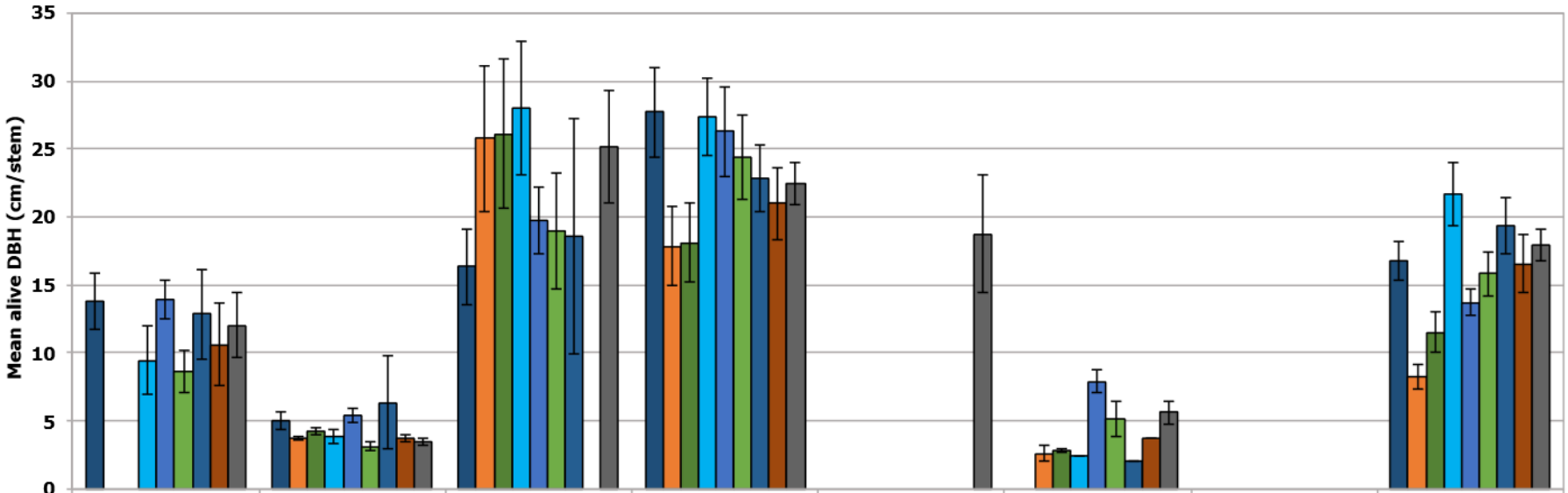


Figure 9i: **Mean DBH (cm) of alive trees (all stems ≥130 cm in height) in areas rehabilitated in 2015, following assessment in 2020 and 2025**
Note: DBH values <2 cm were excluded from analysis.



	Allocasuarina huegeliana	Allocasuarina sp.	Banksia grandis	Corymbia calophylla	Eucalyptus accedens	Eucalyptus drummondii	Eucalyptus marginata	Eucalyptus patens	Eucalyptus wandoo	Grand Total
2021							2.2			2.2
2025	5.4	3.8	3.2	3.9	4.0	6.4	5.8	5.4	4.2	4.5

Figure 9j: **Mean DBH (cm) of alive trees (all stems ≥130 cm in height) in areas rehabilitated in 2020, following assessment in 2021 and 2025**
Note: DBH values <2 cm were excluded



	Allocasuarina fraseriana	Banksia grandis	Corymbia calophylla	Eucalyptus marginata	Eucalyptus wandoo	Persoonia longifolia	Santalum acuminatum	Total species
1998	13.8	5.1	16.3	27.7	0.0	0.0	0.0	16.7
1999	0.0	3.8	25.8	17.8	0.0	2.6	0.0	8.2
2002	0.0	4.2	26.1	18.1	0.0	2.9	0.0	11.5
2016	9.4	3.9	28.0	27.4	0.0	2.5	0.0	21.7
2019	13.9	5.4	19.8	26.3	0.0	7.9	0.0	13.7
2022	8.6	3.2	19.0	24.4	0.0	5.2	0.0	15.8
2023	12.9	6.4	18.6	22.8	0.0	2.0	0.0	19.3
2024	10.6	3.7	0.0	21.0	0.0	3.7	0.0	16.6
2025	12.0	3.4	25.1	22.5	18.8	5.6	0.0	18.0

Figure 9k: **Mean DBH (cm) of alive trees (all stems ≥130 cm in height) in Forest Control Plots in 1998, 1999, 2002, 2016, 2019, 2022, 2023, 2024 and 2025**

5.2.4 Annual Growth Rate

The annual growth rates were assessed over the 30 years, 20 years and 10 years in 1995 rehabilitation areas.

The annual mean height growth rates for rehabilitation areas monitored at BBM in 2025 were generally positive, except for the *Allocasuarina* sp. which at the time was not allocated to the specific species. The greatest height growth rate recorded for a species was Banksia grandis (36.42cm/year) within 10 years and Eucalyptus marginata (30.32cm/year) within 30 years.

The annual DBH growth rates were assessed over the 30 years, 20 years and 10 years in 1995 rehabilitation areas. The greatest DBH growth rate for an individual species was *Banksia grandis* in 10 years (0.63cm/year) and *Banksia grandis* in 30 years (0.56cm/year). The lowest growth rates were associated with the *Allocasuarina* species.

Table 14: Mean annual height and DBH growth rates (cm/year) of alive tree species assessed in 2025
Rates are calculated between year of establishment of rehabilitation on 1995 areas.

SPECIES	REHABILITATION YEAR					
	10 Years		20 Years		30 Years	
	Height rate	DBH rate	Height rate	DBH rate	Height rate	DBH rate
Allocasuarina fraseriana	7.05	0.19	4.61	0.13	14.17	0.15
Allocasuarina huegeliana	2.22	0.07	-1.89	0.13	8.52	-0.01
Allocasuarina sp.	-6.00	-	0.00	-	-0.34	-
Banksia grandis	36.42	0.63	18.10	0.50	20.24	0.56
Corymbia calophylla	2.69	0.33	13.08	0.35	26.39	0.38
Eucalyptus marginata	20.34	0.11	28.88	0.32	30.32	0.46
Mean Growth Rate	**12.37**	**0.17**	**18.37**	**0.29**	**23.43**	**0.38**

Figure 10 presents a graphical overview of the overall mean annual height and mean annual DBH growth rates (cm/year) recorded for alive trees assessed in 2025 within the 1995 rehabilitation areas.

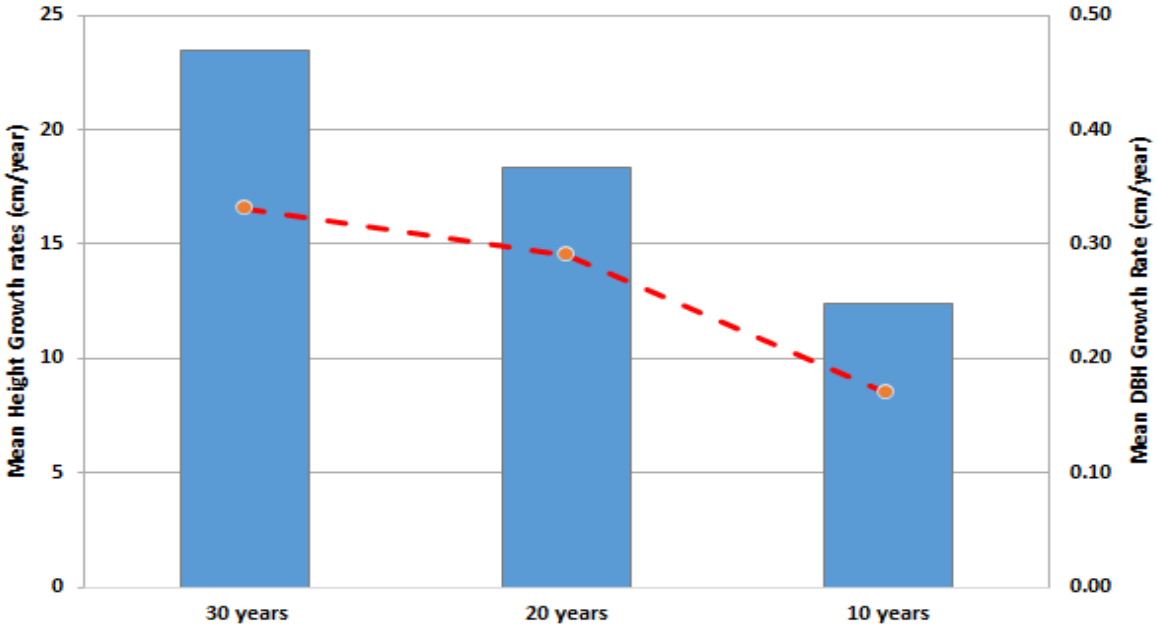
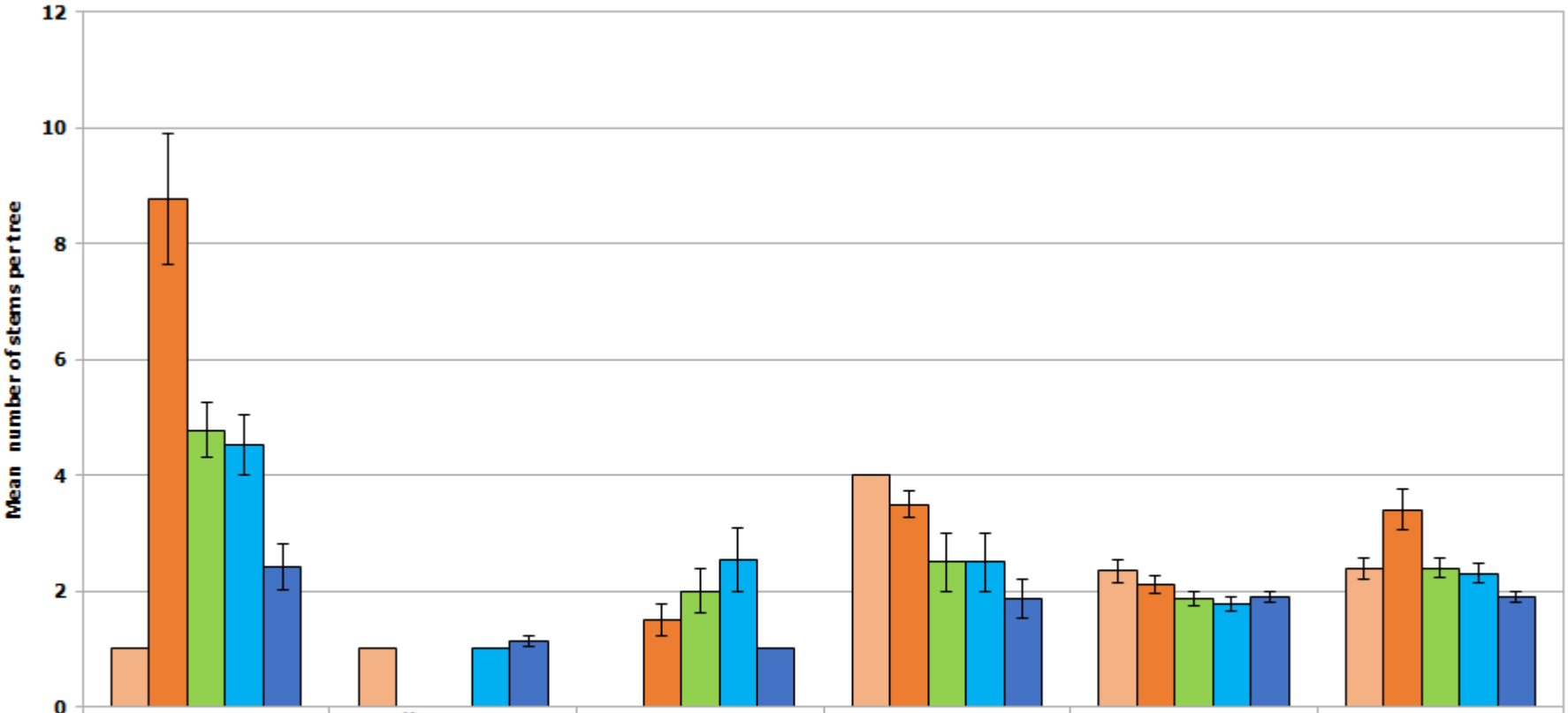


Figure 10: Mean annual height and DBH growth rates (cm/year) of alive tree species in 1995 rehabilitation areas as assessed in 2005, 2015 and 2025

5.2.5 Mean Number of Stems per Tree and Mean Bole Height

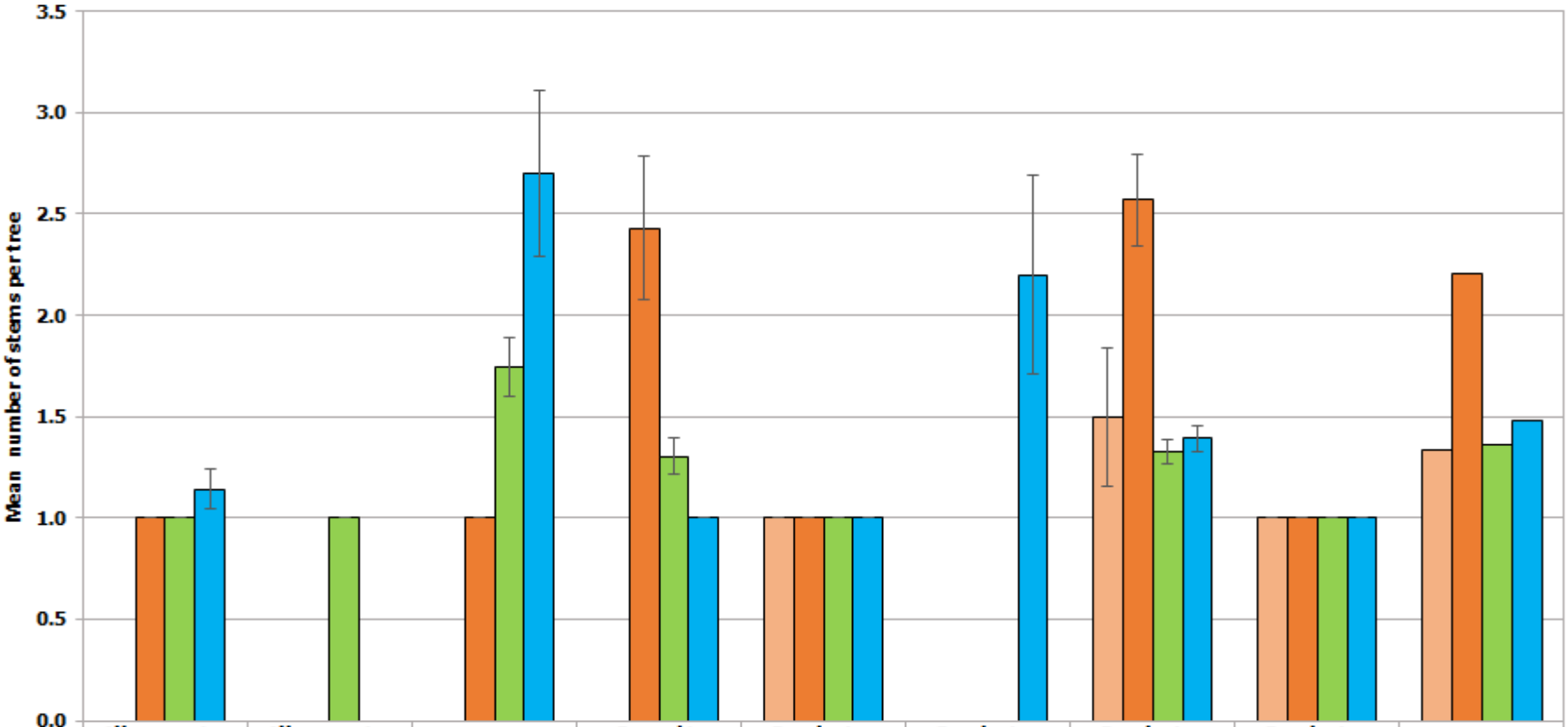
The mean number of stems per tree recorded within the rehabilitation areas reflected differences between tree species, with *Eucalyptus marginata, Eucalyptus patens* and *Eucalyptus wandoo* having higher mean stem numbers than the other Eucalypt species, *Banksia grandis* and the *Allocasuarina* species. The mean number of stems was higher in the older rehabilitation areas (1995), Figure 11a.

Mean bole heights for trees recorded within the 1995, 2005, 2015 and 2020 rehabilitation areas. Mean bole height varied greatly between tree species and individuals. The results for some of the bole heights on older rehabilitation areas are similar to the boles on the trees in the forest control plots. The bole heights for the trees in the older rehabilitation areas were generally higher.



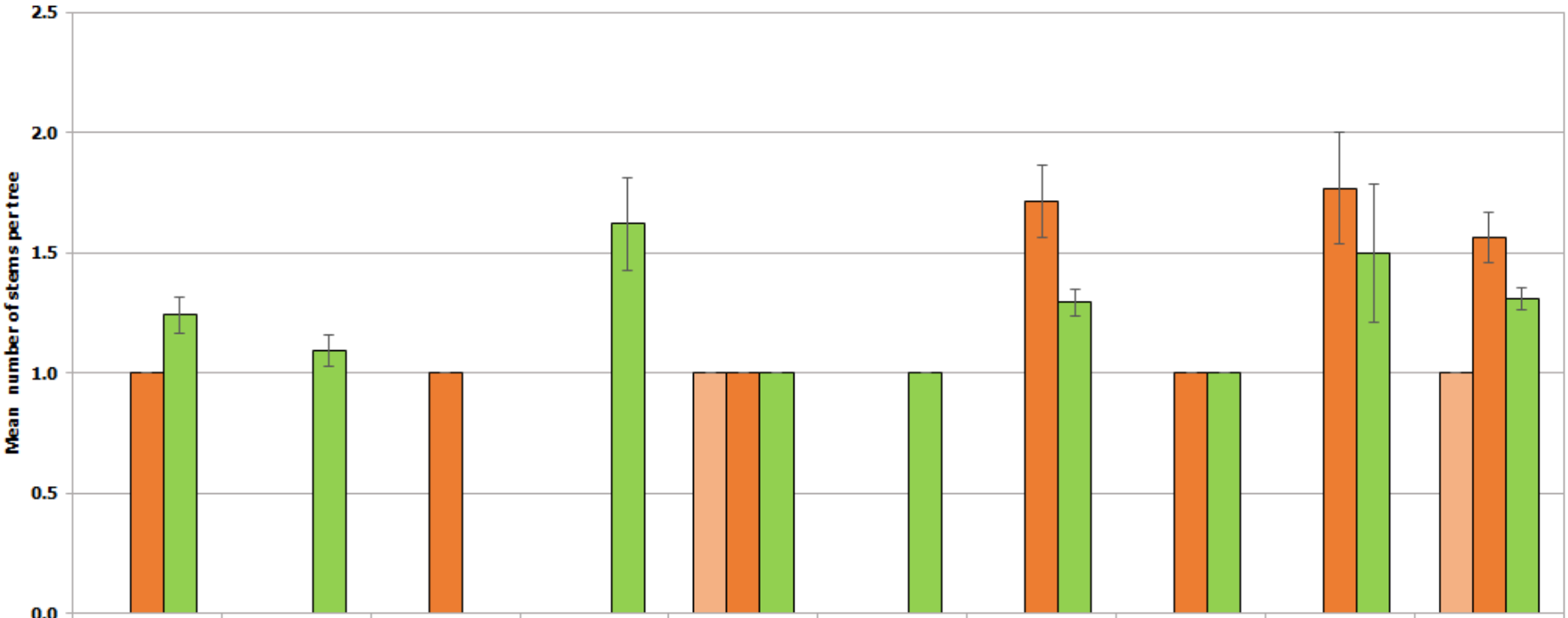
	Allocasuarina fraseriana	Allocasuarina huegeliana	Banksia grandis	Corymbia calophylla	Eucalyptus marginata	Grand Total
1999	1.0	1.0		4.0	2.4	2.4
2005	8.8		1.5	3.5	2.1	3.4
2010	4.8		2.0	2.5	1.9	2.4
2015	4.5	1.0	2.5	2.5	1.8	2.3
2025	2.4	1.1	1.0	1.9	1.9	1.9

Figure 11a: Mean number of stems (± se) in areas rehabilitated in 1995, following assessments in 1999, 2005, 2010, 2015 and 2025



	Allocasuarina fraseriana	Allocasuarina huegeliana	Banksia grandis	Corymbia calophylla	Eucalyptus accedens	Eucalyptus drummondii	Eucalyptus marginata	Eucalyptus wandoo	Grand Total
2009					1.0		1.5	1.0	1.3
2012	1.0		1.0	2.4	1.0		2.6	1.0	2.2
2015	1.0	1.0	1.7	1.3	1.0		1.3	1.0	1.4
2025	1.1		2.7	1.0	1.0	2.2	1.4	1.0	1.5

Figure 11b: Mean alive number of stems (≥130 cm in height) in areas rehabilitated in 2005, following assessments in 2009, 2012, 2015 and 2025



	Allocasuarina fraseriana	Allocasuarina huegeliana	Allocasuarina sp.	Banksia grandis	Corymbia calophylla	Eucalyptus accedens	Eucalyptus marginata	Eucalyptus patens	Eucalyptus wandoo	Grand Total
2016					1.0					1.0
2020	1.0		1.0		1.0		1.7	1.0	1.8	1.6
2025	1.2	1.1		1.6	1.0	1.0	1.3	1.0	1.5	1.3

Figure 11c: Mean alive number of stems (≥130 cm in height) in areas rehabilitated in 2015, following assessments in 2016, 2020 and 2025

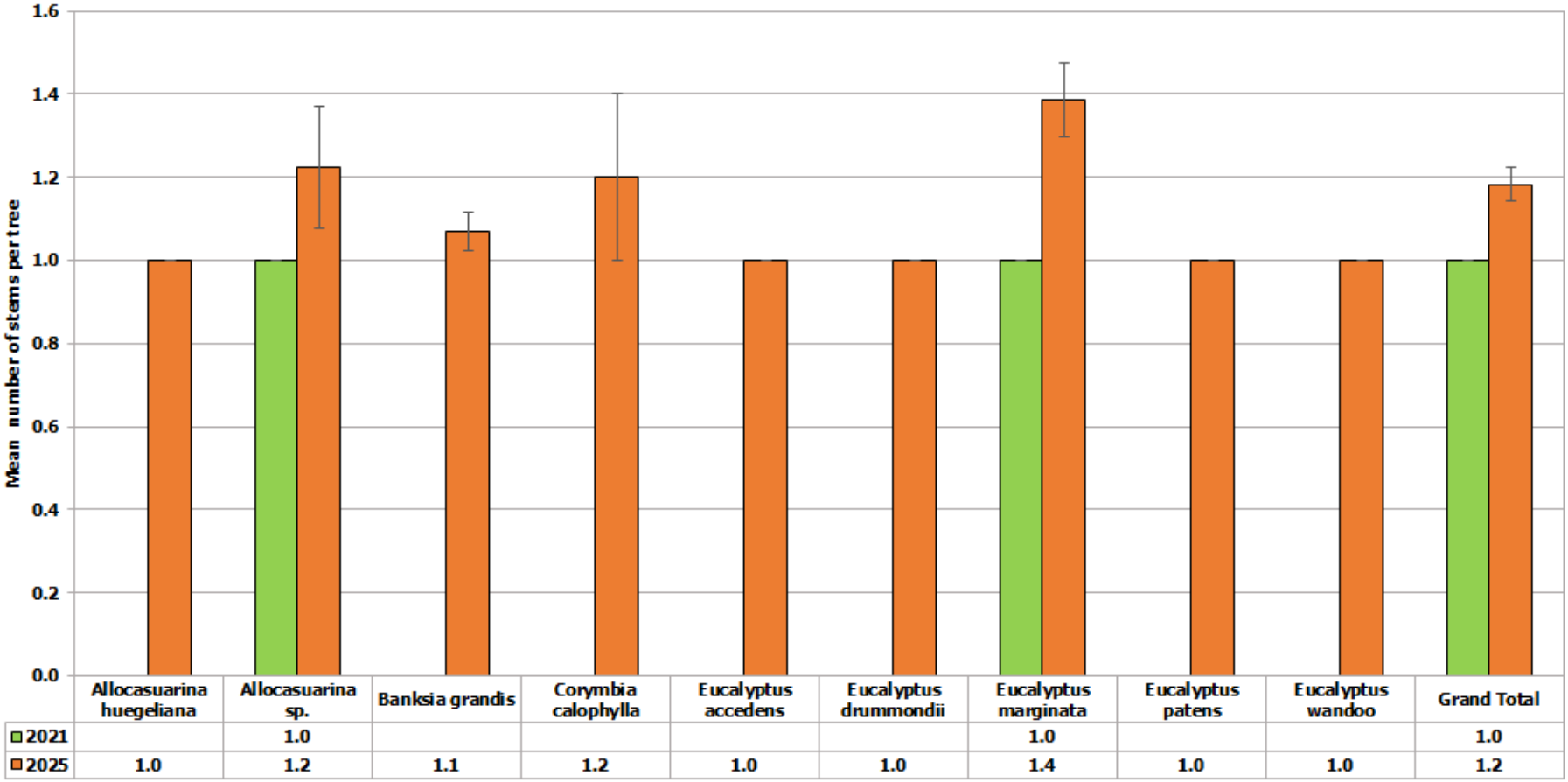
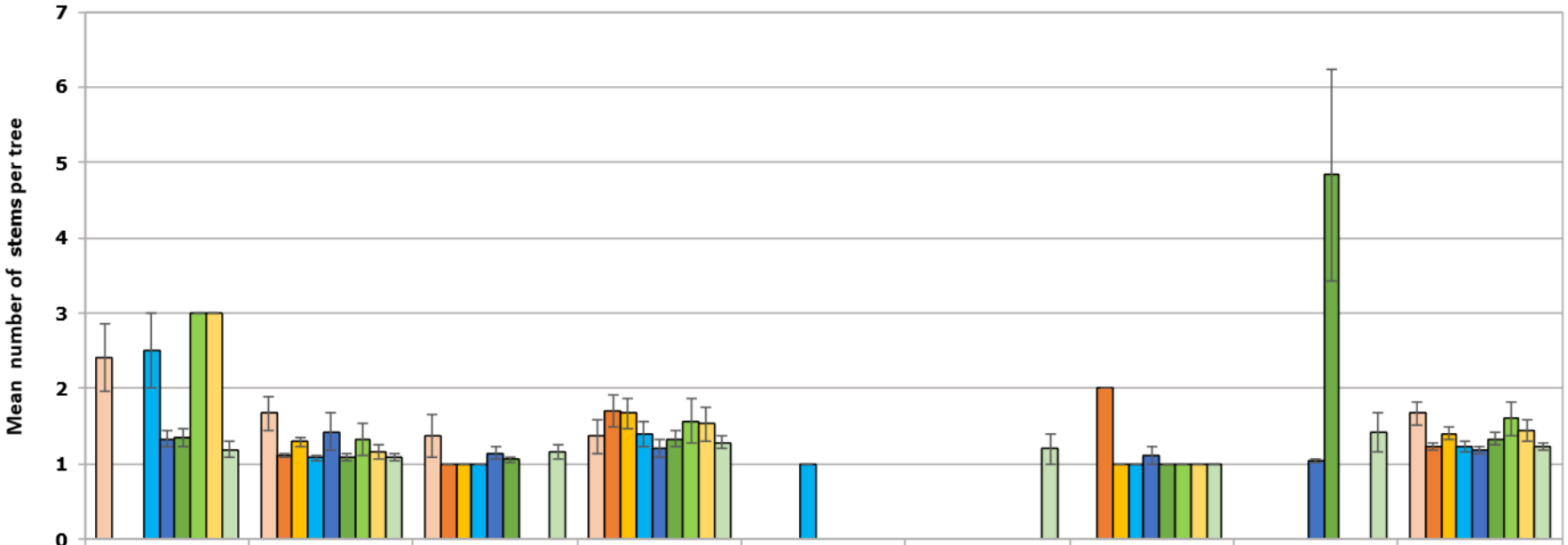
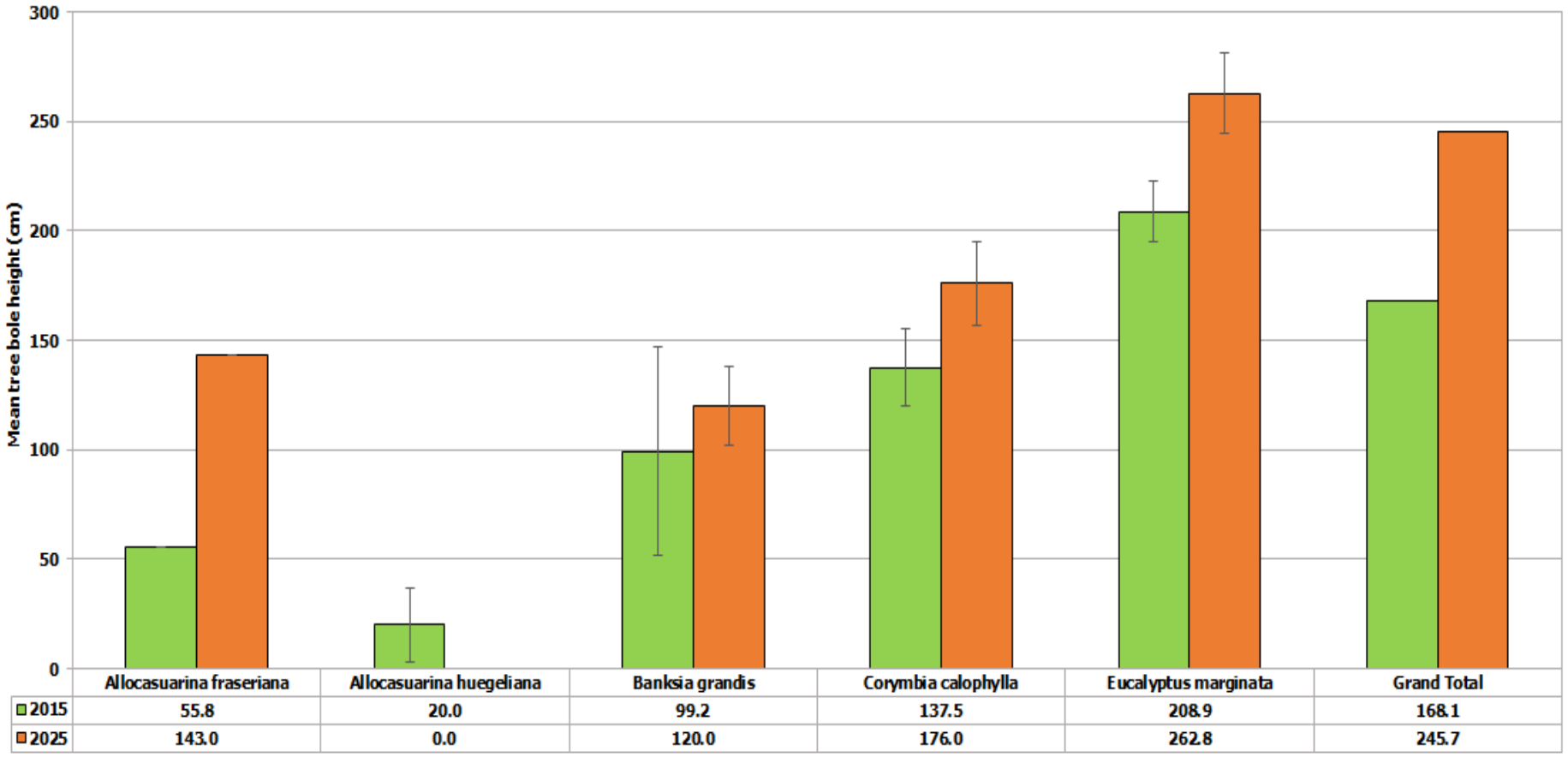


Figure 11d: Mean alive number of stems (≥130 cm in height) in areas rehabilitated in 2020, following assessment in 2025



	Allocasuarina fraseriana	Banksia grandis	Corymbia calophylla	Eucalyptus marginata	Eucalyptus sp.	Eucalyptus wandoo	Persoonia longifolia	Santalum acuminatum	Total species
1998	2.4	1.7	1.4	1.4	0.0	0.0	0.0	0.0	1.7
1999	0.0	1.1	1.0	1.7	0.0	0.0	2.0	0.0	1.2
2002	0.0	1.3	1.0	1.7	0.0	0.0	1.0	0.0	1.4
2016	2.5	1.1	1.0	1.4	1.0	0.0	1.0	0.0	1.2
2019	1.3	1.4	1.1	1.2	0.0	0.0	1.1	1.0	1.2
2022	1.3	1.1	1.1	1.3	0.0	0.0	1.0	4.8	1.3
2023	3.0	1.3	0.0	1.6	0.0	0.0	1.0	0.0	1.6
2024	3.0	1.2	0.0	1.5	0.0	0.0	1.0	0.0	1.4
2025	1.2	1.1	1.2	1.3	0.0	1.2	1.0	1.4	1.2

Figure 11e: Mean alive number of stems (≥130 cm in height) in Forest Control Plots in 1998, 1999 , 2002, 2016, 2019, 2022, 2023, 2024 and 2025



	Allocasuarina fraseriana	Allocasuarina huegeliana	Banksia grandis	Corymbia calophylla	Eucalyptus marginata	Grand Total
2015	55.8	20.0	99.2	137.5	208.9	168.1
2025	143.0	0.0	120.0	176.0	262.8	245.7

Figure 12a: Mean bole height per alive tree in areas rehabilitated in 1995 following assessments in 2015 (20 years) and 2025 (30 years)
Note: Error bars indicate standard error; where there is no standard error, that species was only recorded once in one plot during that assessment year. Blank spaces indicate this species was not recorded in this assessment year.

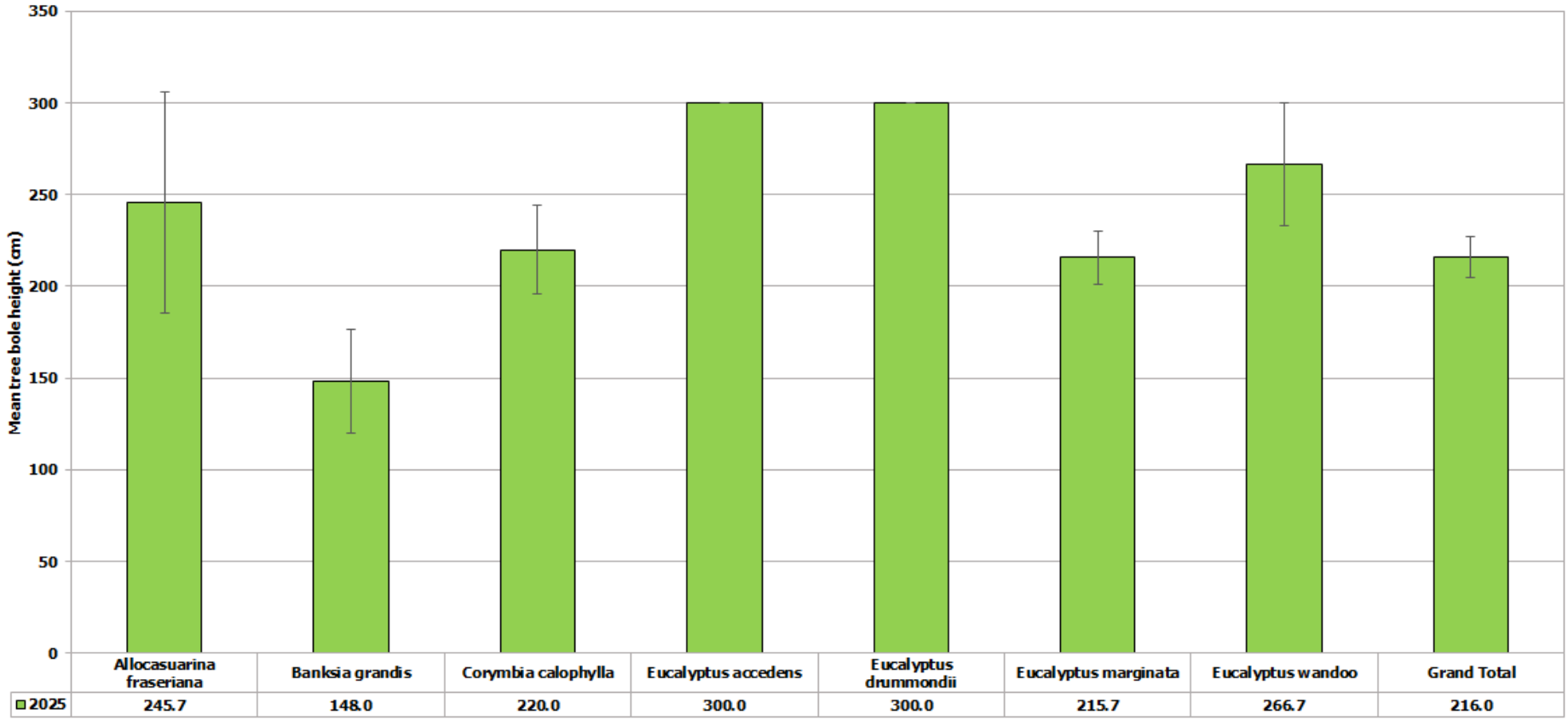
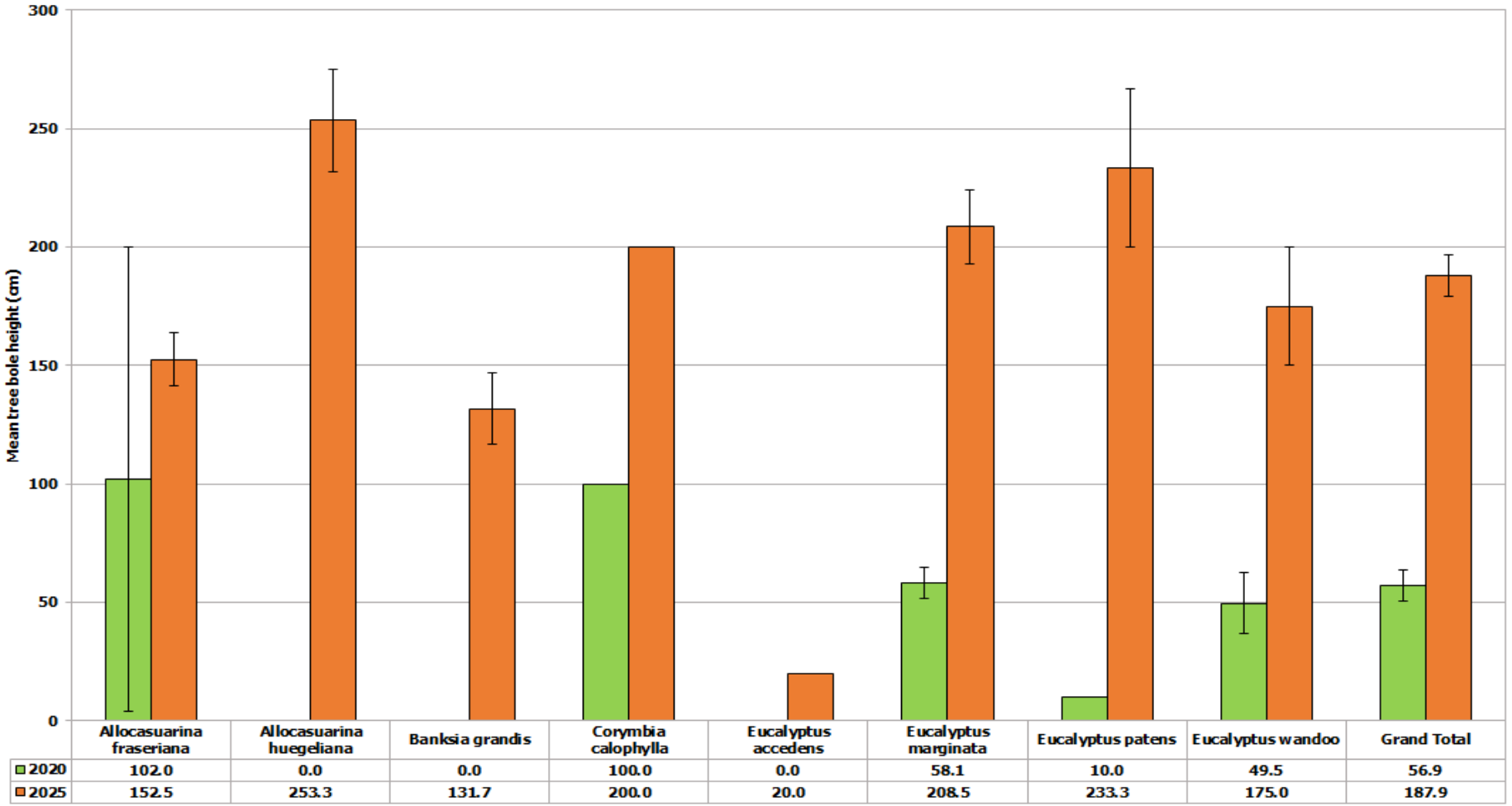


Figure 12b: Mean bole height per alive tree in areas rehabilitated in 2005 following assessments in 2025 (20 years)
Note: Error bars indicate standard error; where there is no standard error, that species was only recorded once in one plot during that assessment year. Blank spaces indicate this species was not recorded in this assessment year.



	Allocasuarina fraseriana	Allocasuarina huegeliana	Banksia grandis	Corymbia calophylla	Eucalyptus accedens	Eucalyptus marginata	Eucalyptus patens	Eucalyptus wandoo	Grand Total
2020	102.0	0.0	0.0	100.0	0.0	58.1	10.0	49.5	56.9
2025	152.5	253.3	131.7	200.0	20.0	208.5	233.3	175.0	187.9

Figure 12c: **Mean bole height per alive tree in areas rehabilitated in 2015 following assessments in 2025 (10 years)**
Note: Error bars indicate standard error; where there is no standard error, that species was only recorded once in one plot during that assessment year. Blank spaces indicate this species was not recorded in this assessment year.

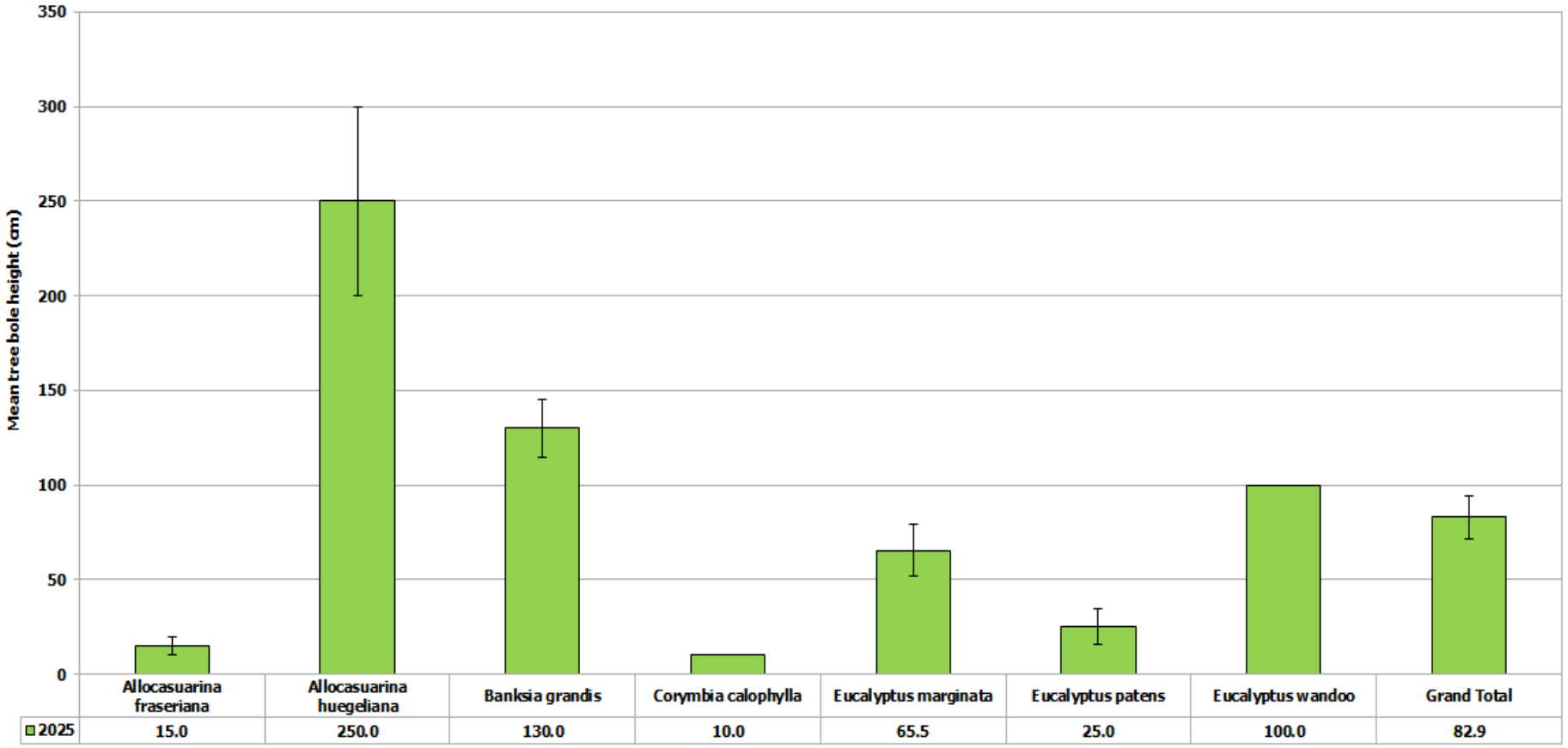
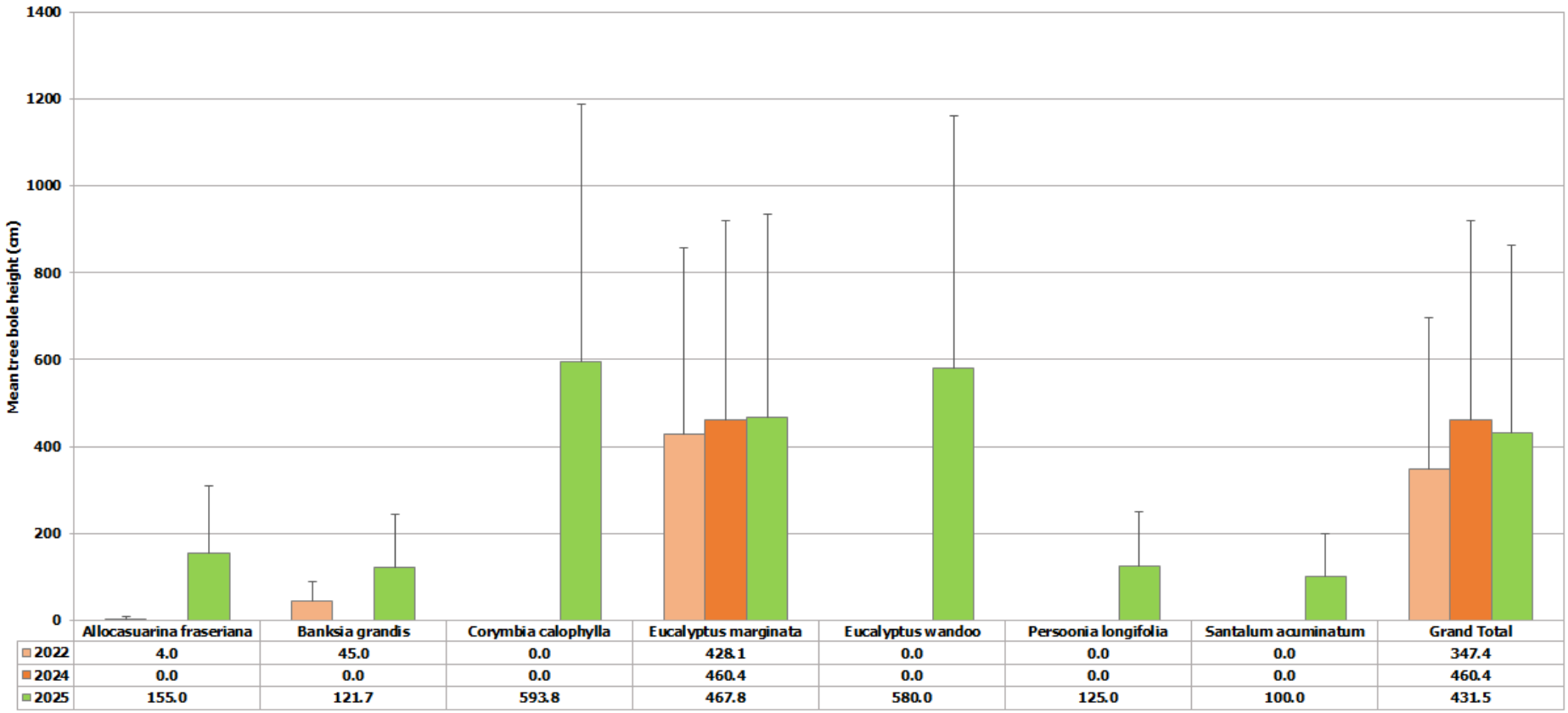


Figure 12d: **Mean bole height per alive tree in areas rehabilitated in 2020 following assessments in 2025 (5 years)**
Note: Error bars indicate standard error; where there is no standard error, that species was only recorded once in one plot during that assessment year. Blank spaces indicate this species was not recorded in this assessment year.



	Allocasuarina fraseriana	Banksia grandis	Corymbia calophylla	Eucalyptus marginata	Eucalyptus wandoo	Persoonia longifolia	Santalum acuminatum	Grand Total
2022	4.0	45.0	0.0	428.1	0.0	0.0	0.0	347.4
2024	0.0	0.0	0.0	460.4	0.0	0.0	0.0	460.4
2025	155.0	121.7	593.8	467.8	580.0	125.0	100.0	431.5

Figure 12e: Mean bole height per alive tree in Forest Control Plots in 2022, 2024 and 2025
Note: Error bars indicate standard error; where there is no standard error, that species was only recorded once in one plot during that assessment year. Blank spaces indicate this species was not recorded in this assessment year.

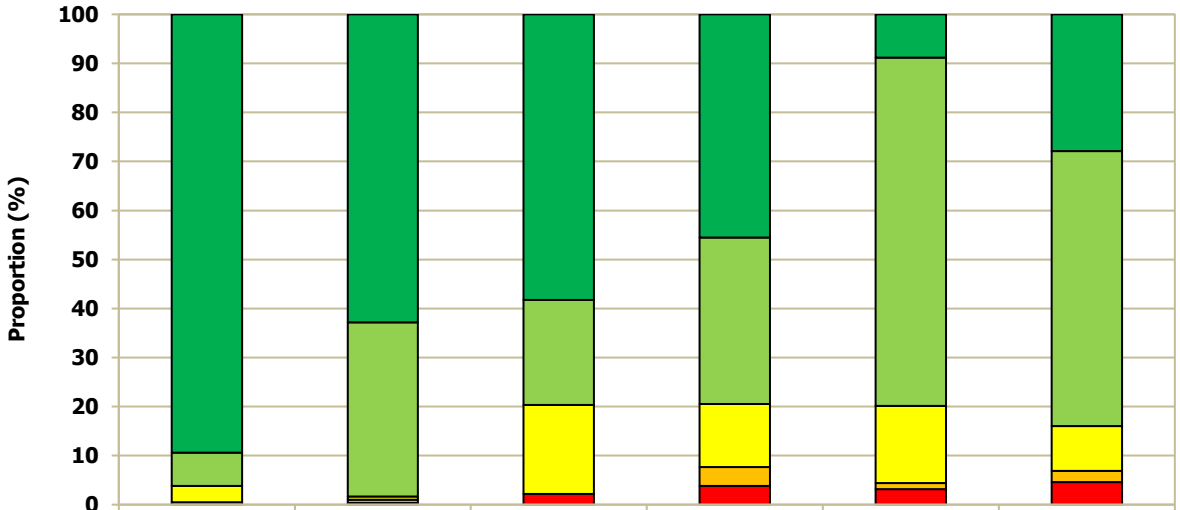
5.2.6 Tree Condition and Insect Attack

The proportion (%) of each health condition category for trees and seedlings within each rehabilitation year and control plots recorded at BBM during 2025 is presented in Figures 13a to 13f and the insect damage is summarized in 14a to 14f, Table 15. Results show a strong trend for tree health to decline as the age since rehabilitation increases. As the proportion of Healthy trees decreases the proportion of Slightly Stressed and Stressed trees increases, with the percentage of Dead trees also increasing as the rehabilitation ages overall (Table 15).

Table 15: Proportion of each health condition category for seedlings in areas rehabilitated in 2024, following assessment in 2025

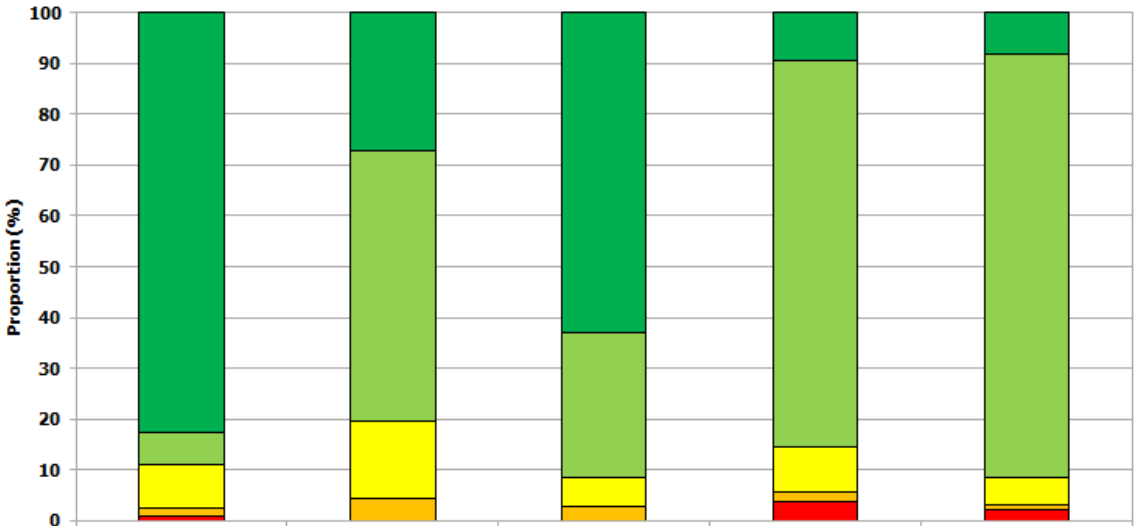
Health Condition	Proportion (%)
Healthy	56.82
Slightly Stressed	32.24
Stressed	9.27
Very Stressed	1.52
Dead	0.05

The decline of tree health is occurring in most rehabilitation areas at an accelerated rate. This is evident, for example, when looking at the older rehabilitation areas after 10 years when competition for resources may be more relevant. This declining trend has been observed in previous monitoring periods for different ages of rehabilitation (Mattiske Consulting Pty Ltd, 2010; 2011; 2012; 2013; 2014; 2015; 2016; 2017; 2018; 2019, 2020, 2021, 2022, 2023, 2024). The subjective nature of assessing tree health may have an impact on these results, but there may also be an influence from climatic changes over time. To counter balance these declining trends are the tendency for overstocking in initial phases of rehabilitation, which in some instances has required some thinning of trees. The condition assessment of the trees on the forest control plots also reflects the degree of decline in the local forest communities (Figure 13f).



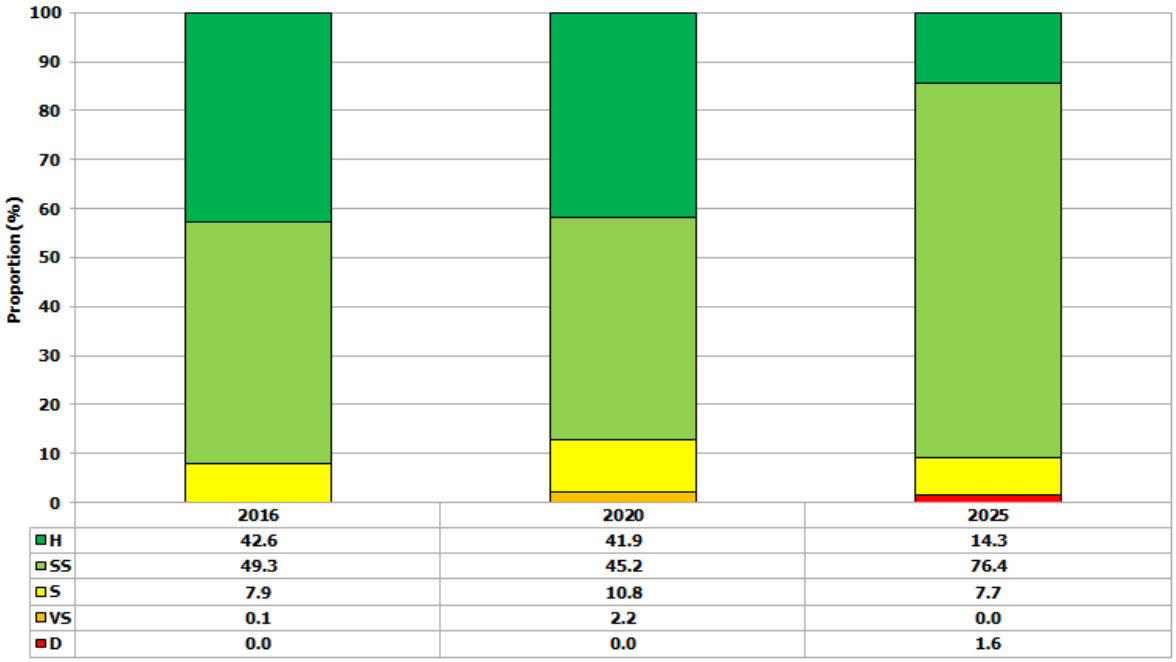
	1996	1999	2005	2010	2015	2025
H	89.4	62.8	58.2	45.5	8.8	27.9
SS	6.7	35.5	21.4	34.0	71.1	56.1
S	3.4	0.7	18.1	12.8	15.7	9.2
VS	0.5	0.7	0.0	3.8	1.3	2.3
D	0.0	0.3	2.2	3.8	3.1	4.6

Figure 13a: **Proportion of each health condition category for trees and seedlings in areas rehabilitated in 1995, following assessments in 1996, 1999, 2005, 2010, 2015 and 2025**



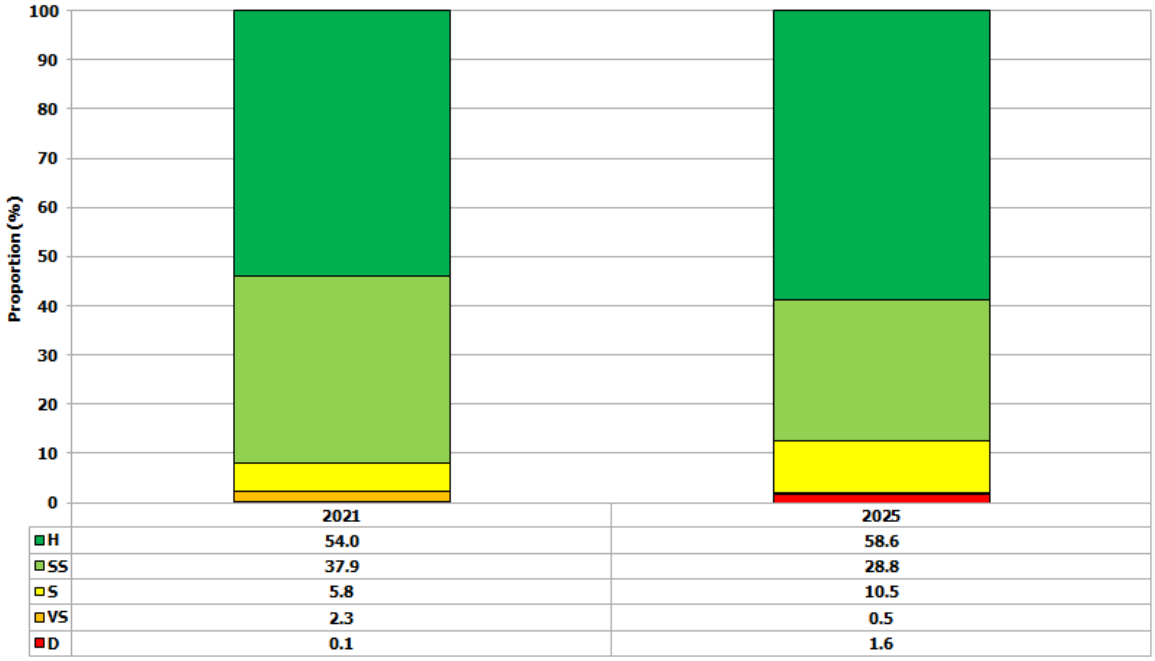
	2006	2009	2012	2015	2025
H	82.5	27.0	63.1	9.3	8.1
SS	6.5	53.5	28.4	76.2	83.2
S	8.4	15.1	5.7	8.9	5.6
VS	1.7	4.4	2.8	2.0	1.0
D	0.8	0.0	0.0	3.6	2.0

Figure 13b: **Proportion of each health condition category for trees and seedlings in areas rehabilitated in 2005, following assessments in 2006, 2009, 2012, 2015 and 2025**



	2016	2020	2025
H	42.6	41.9	14.3
SS	49.3	45.2	76.4
S	7.9	10.8	7.7
VS	0.1	2.2	0.0
D	0.0	0.0	1.6

Figure 13c: Proportion of each health condition category for trees and seedlings in areas rehabilitated in 2015, following assessments in 2016, 2020 and 2025



	2021	2025
H	54.0	58.6
SS	37.9	28.8
S	5.8	10.5
VS	2.3	0.5
D	0.1	1.6

Figure 13d: Proportion of each health condition category for trees and seedlings in areas rehabilitated in 2020, following assessments in 2021 and 2025

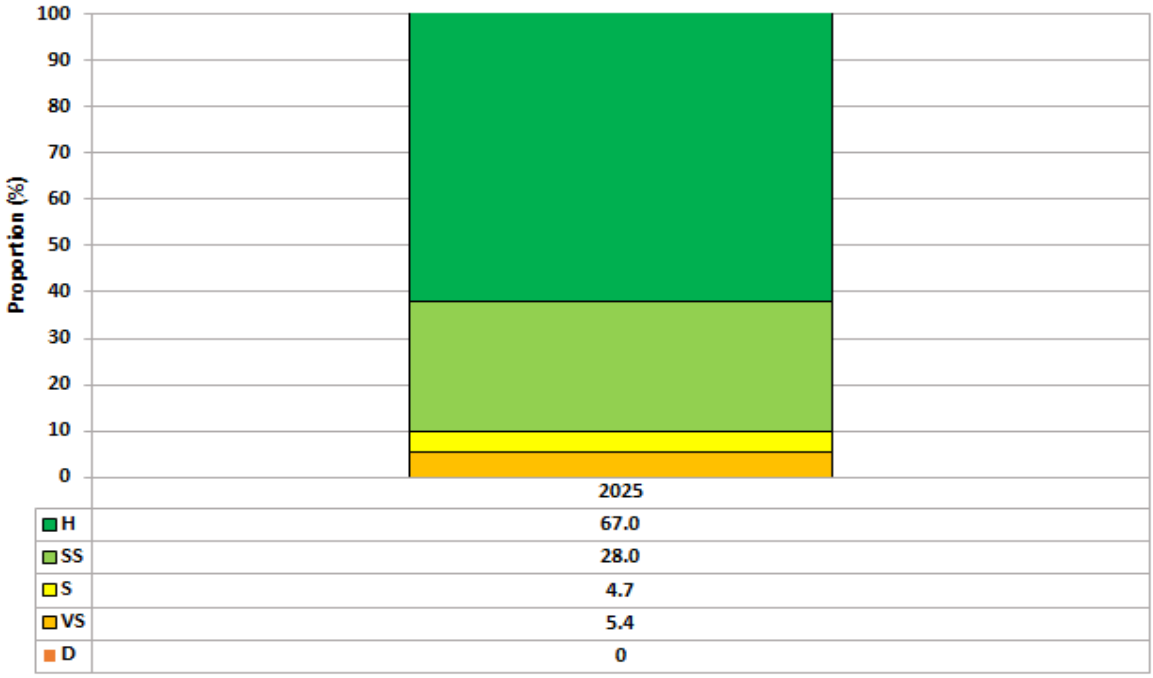
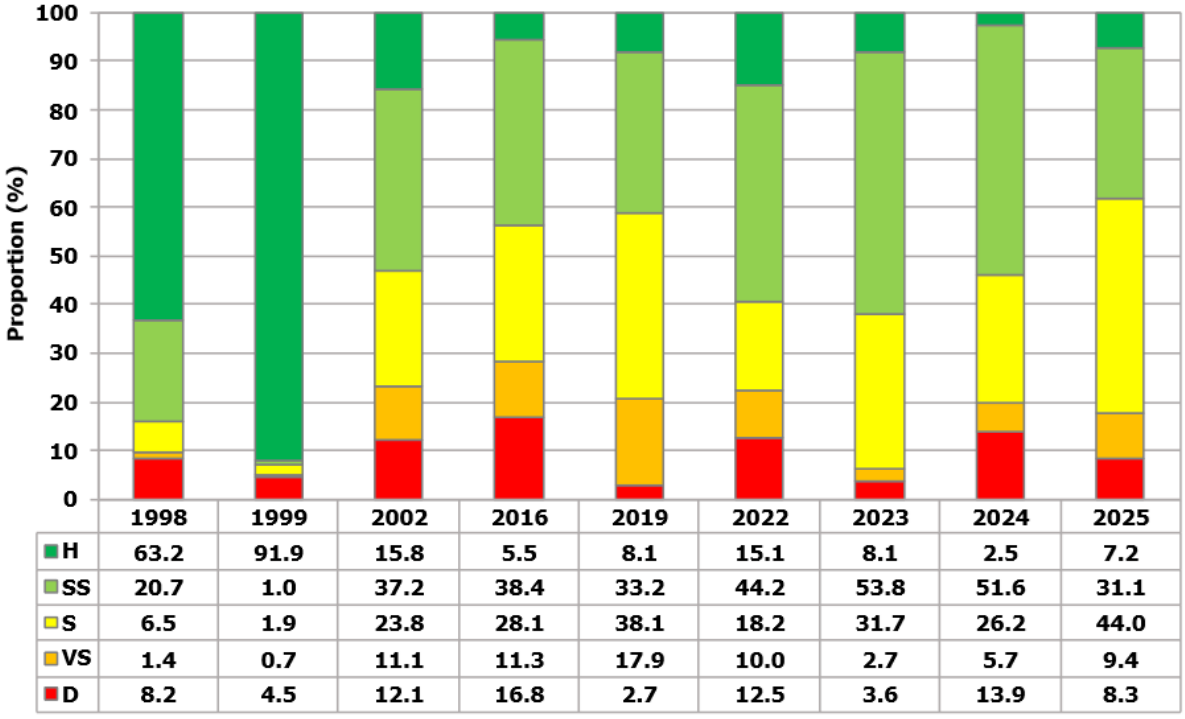


Figure 13e: **Proportion of each health condition category for trees and seedlings in areas rehabilitated in 2024, following assessment in 2025**



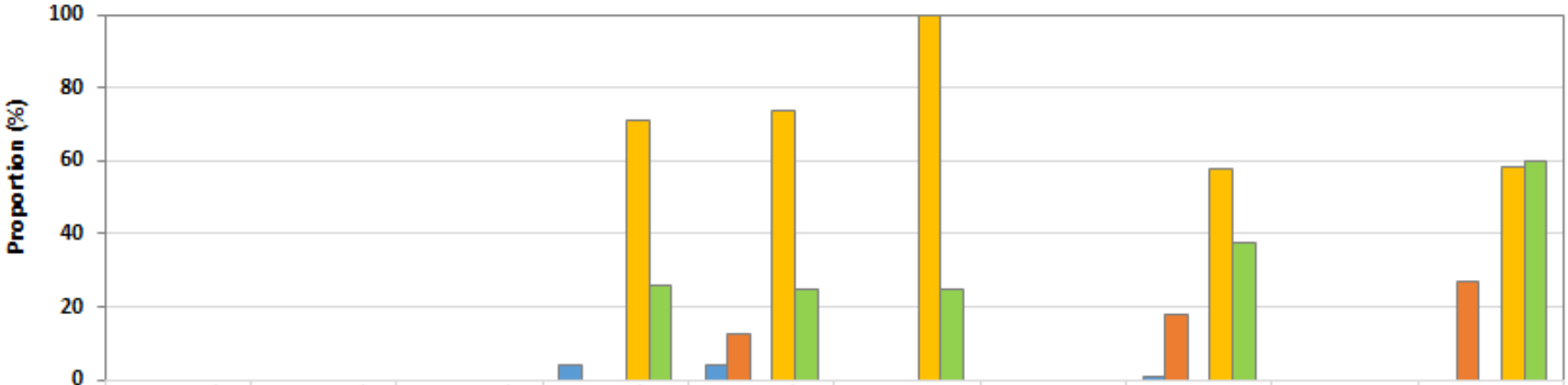
	1998	1999	2002	2016	2019	2022	2023	2024	2025
H	63.2	91.9	15.8	5.5	8.1	15.1	8.1	2.5	7.2
SS	20.7	1.0	37.2	38.4	33.2	44.2	53.8	51.6	31.1
S	6.5	1.9	23.8	28.1	38.1	18.2	31.7	26.2	44.0
VS	1.4	0.7	11.1	11.3	17.9	10.0	2.7	5.7	9.4
D	8.2	4.5	12.1	16.8	2.7	12.5	3.6	13.9	8.3

Figure 13f: **Proportion of each health condition category for trees and seedlings in the eight Forest Control Plots in 1998, 1999, 2002, 2016, 2019, 2022, 2023, 2024 and 2025**



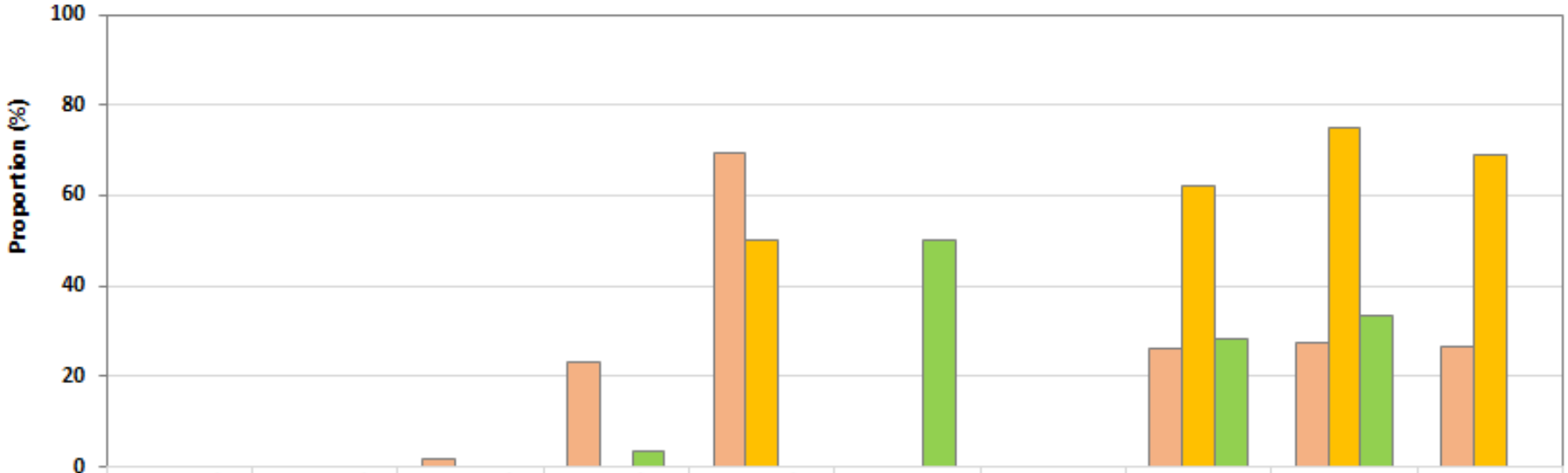
	Allocasuarina fraseriana	Allocasuarina huegeliana	Allocasuarina sp.	Banksia grandis	Corymbia calophylla	Eucalyptus marginata
1996	0	0	0	0	0	0
1999	0	0	0	0	16.7	19.3
2005	0	0	0	0	0	0
2010	0	0	0	0	0	0
2015	0	0	0	34.6	80	57.7
2025	3.1	1.8	0	0	50	55.3

Figure 14a: Proportion of tree species affected by insect attack in areas rehabilitated in 1995, following assessments in 1996, 1999, 2005, 2010, 2015 and 2025



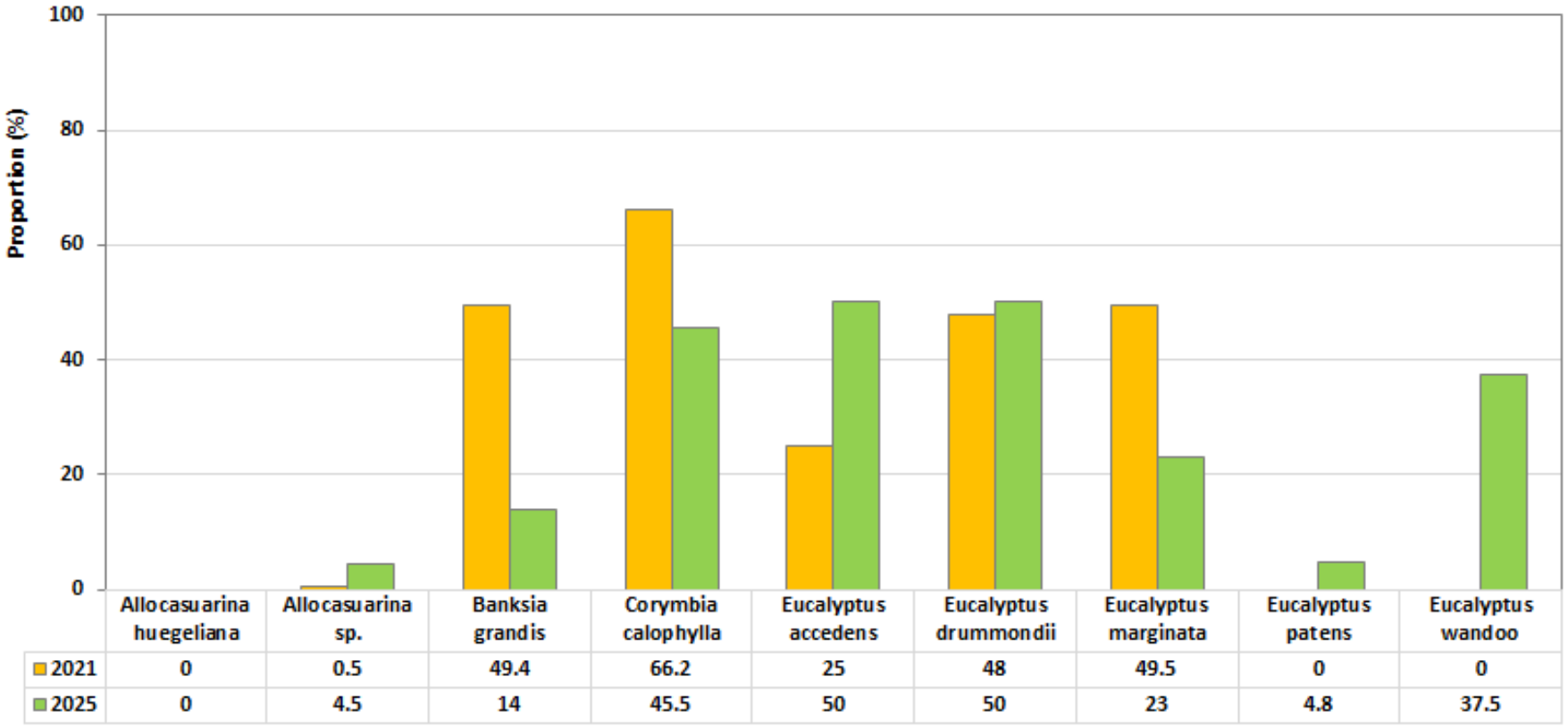
	Allocasuarina fraseriana	Allocasuarina huegeliana	Allocasuarina sp.	Banksia grandis	Corymbia calophylla	Eucalyptus accedens	Eucalyptus drummondii	Eucalyptus marginata	Eucalyptus sp.	Eucalyptus wandoo
2006	0	0	0	4.1	3.9	0	0	1.1	0	0
2009	0	0	0	0	12.5	0	0	17.8	0	26.7
2012	0	0	0	0	0	0	0	0	0	0
2015	0	0	0	71.1	73.8	100	0	57.9	0	58.3
2025	0	0	0	25.9	25	25	0	37.8	0	60

Figure 14b: Proportion (%) of tree species affected by insect attack in areas rehabilitated in 2005, following assessments in 2006, 2009, 2012, 2015 and 2025



	Allocasuarina fraseriana	Allocasuarina huegeliana	Allocasuarina sp.	Banksia grandis	Corymbia calophylla	Eucalyptus accedens	Eucalyptus drummondii	Eucalyptus marginata	Eucalyptus patens	Eucalyptus wandoo
2016	0	0	1.8	23	69.2	0	0	26	27.3	26.7
2020	0	0	0	0	50	0	0	62	75	68.8
2025	0	0	0	3.3	0	50	0	28.4	33.3	0

Figure 14c: Proportion of tree species affected by insect attack in areas rehabilitated in 2015, following assessments in 2016, 2020 and 2025



	Allocasuarina huegeliana	Allocasuarina sp.	Banksia grandis	Corymbia calophylla	Eucalyptus accedens	Eucalyptus drummondii	Eucalyptus marginata	Eucalyptus patens	Eucalyptus wandoo
2021	0	0.5	49.4	66.2	25	48	49.5	0	0
2025	0	4.5	14	45.5	50	50	23	4.8	37.5

Figure 14d: Proportion of tree species affected by insect attack in areas rehabilitated in 2020, following assessments in 2021 and 2025

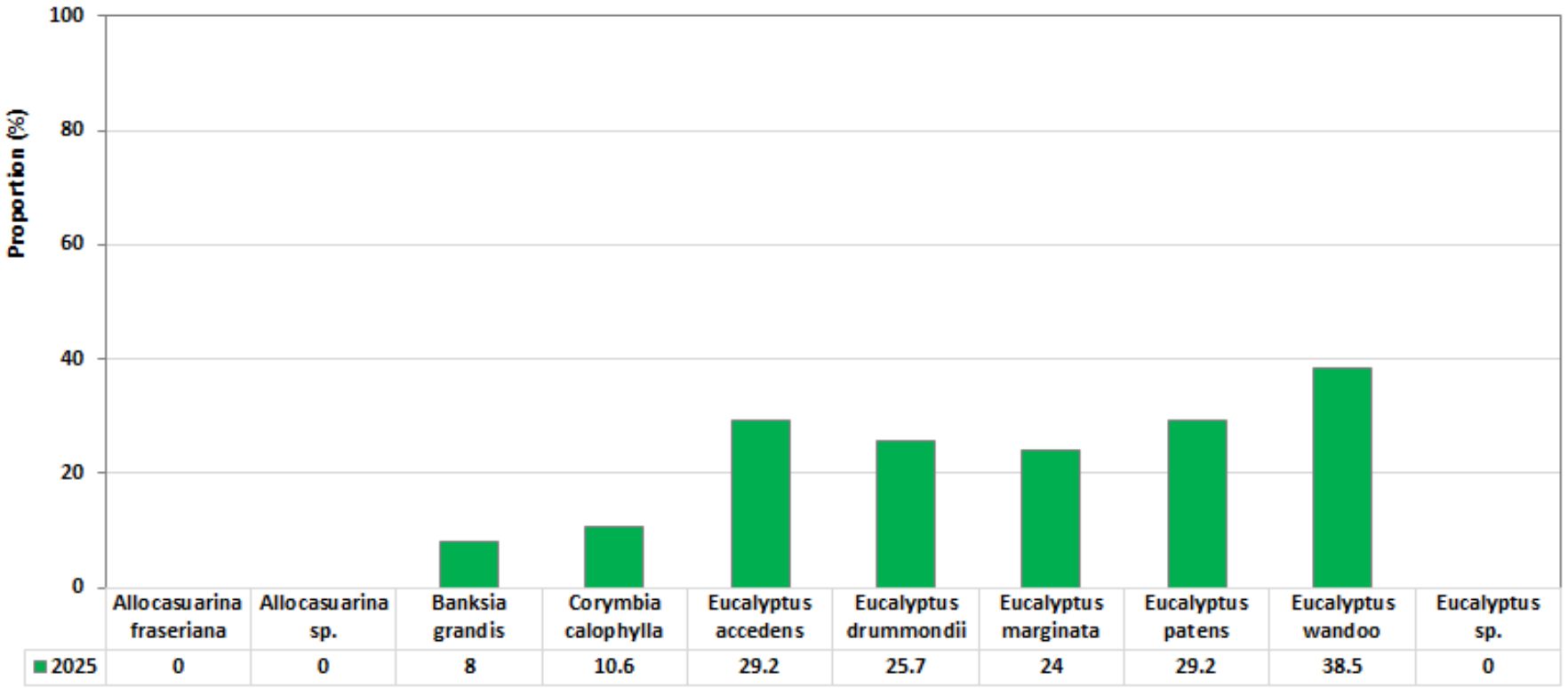
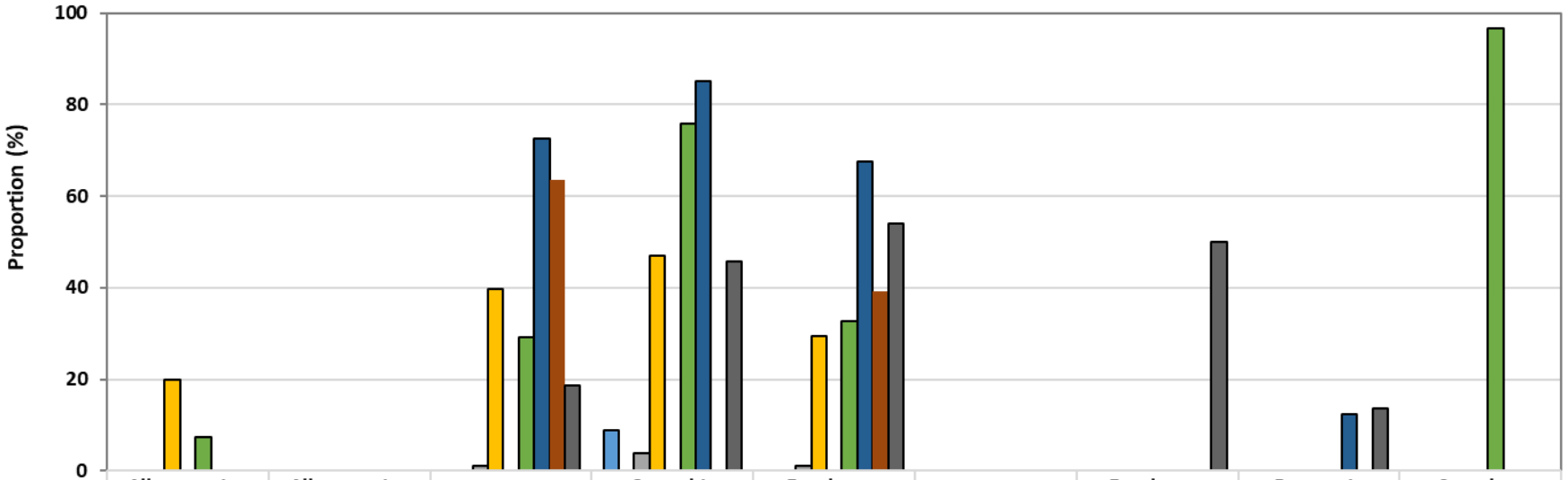


Figure 14e: Proportion (%) of tree species affected by insect attack in areas rehabilitated in 2024 following assessment in 2025



	Allocasuarina fraseriana	Allocasuarina sp.	Banksia grandis	Corymbia calophylla	Eucalyptus marginata	Eucalyptus sp.	Eucalyptus wandoo	Persoonia longifolia	Santalum acuminatum
1998	0.0	0.0	0.0	8.8	0.0	0.0	0.0	0.0	0.0
1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2002	0.0	0.0	1.2	3.8	1.1	0.0	0.0	0.0	0.0
2016	20.0	0.0	39.8	47.1	29.3	0.0	0.0	0.0	0.0
2019	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2022	7.3	0.0	29.1	75.9	32.6	0.0	0.0	0.0	96.7
2023	0.0	0.0	72.5	85.1	67.6	0.0	0.0	12.5	0.0
2024	0.0	0.0	63.6	0.0	39.3	0.0	0.0	0.0	0.0
2025	0.0	0.0	18.6	45.8	54.1	0.0	50.0	13.6	0.0

Figure 14f: Proportion (%) of tree species affected by insect attack in Forest Control Plots in 1998, 1999, 2002, 2016, 2019, 2022, 2023, 2024 and 2025

5.3. Litter Cover 1995 to 2025 and Forest Control Plots

An assessment of average cover of litter in the respective areas reflected an increase in litter cover with age of rehabilitation, Figure 15. The litter values in 1995 and 2005 were becoming more similar to the levels in the analogue sites in the forest monitoring plots (FMPs).

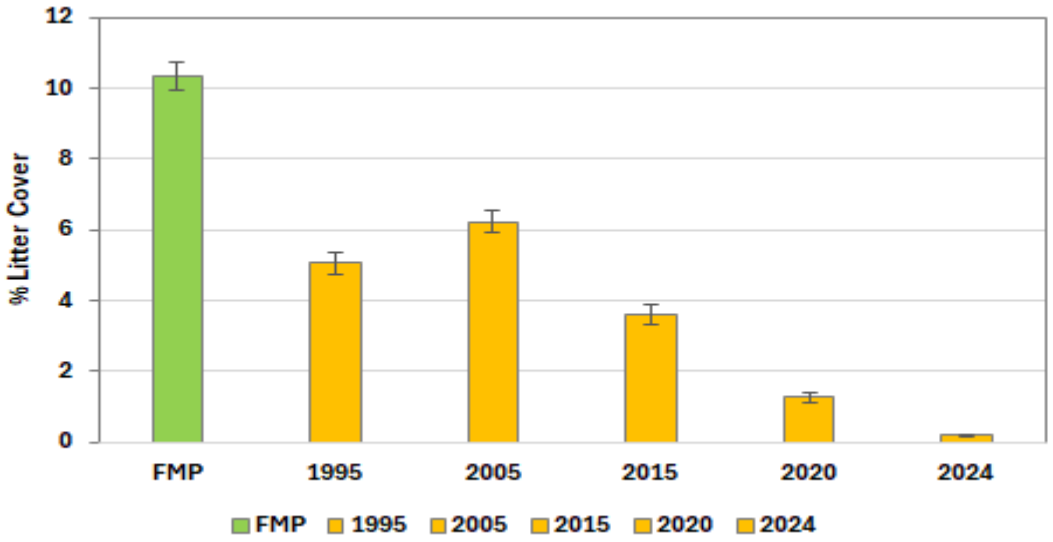


Figure 15: Review of % Cover of Litter, 1995 to 2024 rehabilitation areas and control areas (FMPs)

5.4. Bark Depth

The bark depth was not recorded on the trees in the older rehabilitation areas as the bark depth was still limited in depth in the older 1995 areas.

6. DISCUSSION

The results from the 2025 assessment of mine-pit rehabilitation illustrated the complexity and variability of trends in relation to the age of the rehabilitation, the variation in species richness, plant density, foliage cover and dominance in the respective areas. Information collected in areas with differing rehabilitation ages continues to enable refinement of the rehabilitation practices and the understanding of the rehabilitation and forest ecosystems at the Boddington Bauxite Mine.

The 2025 assessment of 2024 rehabilitation areas enabled a review of progress at 15 months from seedings. Overall, the following results using the previous approach and then re-aligning with the proposed draft changes to the Completion Criteria for rehabilitation areas in State forest areas (as supplied by South32 in 2026):

- Mean tree seedlings of 1829.2 ± 77.7 exceeded the 500-700 trees/ha and as such may need review. Despite the inference that there may be too many tree seedlings, it is worth waiting on management actions as the 5-year and 10-year monitoring results have shown a decline in tree numbers.
- Mean native legumes for 2024 rehabilitation areas in 2025 was 3.03 ± 0.07 plants/m^2 which exceeds the updated draft criterion of >1 plants/m2.
- Mean native non-legumes for 2024 rehabilitation areas in 2025 was 3.53 ± 0.13 plants/m^2 which exceeds the updated draft criterion of >1 plants/m2.
- Mean native plant densities for all species in the 2024 rehabilitation areas in 2025 was 6.56 ± 0.14 which exceeds the >1 mean all native plants/m^2 in the updated draft criterion.
- Mean native species richness exceeds the 51.03 ± 1.75 native plant species/plot (80m^2). This is similar to the forest monitoring plots of 55.38 native plants/plot (80m^2).
- Mean introduced species richness was 6.77 ± 0.62 native plant species/plot (80m^2)which is relatively high. As most of the introduced species are annual species, results consistently reflect a decline in introduced species as the native species start to dominate the rehabilitation areas.
- No declared weeds were recorded in the 2024 rehabilitation areas in 2025.
- Mean native plant densities in the 2024 rehabilitation areas in 2025 was 6.56 ± 0.14 plants/m^2 which exceeds the >1 mean all native plants/m^2.in the updated draft criterion.
- Mean introduced densities of plants was 0.83 ± 0.07 plants/m^2 and a such meets the updated draft criterion of <5 plants/m^2.

The 2025 assessment of 2020 rehabilitation areas enabled a review of progress at five years. Overall, the following results using the previous approach and then re-aligning with the proposed draft changes to the Completion Criteria for rehabilitation areas in State forest areas (as supplied by South32 in 2026):

- Mean trees of 387.5 ± 24.0 trees/ha met the 500-700 trees/ha providing the standard error is included in the results. This exceeds the >200 mature trees/ha as in the draft updated completion criterion.
- Mean trees of 150.00 ± 60.21 trees/ha met the >200 mature *Eucalyptus marginata* and *Corymbia calophylla* trees/ha providing the standard error is included in the results. These results may require some management review.
- Mean native species richness exceeds the 50.00 ± 6.10 native plant species/plot (80m^2). This is similar to the forest monitoring plots of 55.38 native plants/plot (80m^2) and meets the ≥40% of alive native, annual/perennial, understorey species (excluding trees)/ 80m^2 .
- Mean introduced species richness was 4.67 ± 2.03 native plant species/plot (80m^2) which is relatively high, although lower than in the 15-month rehabilitation areas. As most of the introduced species are annual species, results consistently reflect a decline in introduced species as the native species start to dominate the rehabilitation areas. The draft criterion should be changed to mean foliage cover /80m^2 rather than quadrat.
- No declared weeds were recorded in the 2020 rehabilitation areas in 2025.
- Mean native plant densities in the 2020 rehabilitation areas in 2025 was 5.30 ± 0.31/m^2 which is approximately 50% of the overall forest monitoring plots of 11.99 ± 0.31/m^2.
- Mean native foliage cover in the 2020 rehabilitation areas in 2025 was 37.62 ± 2.44 cover/m^2 and a such exceeds the mean foliage cover in the forest monitoring plots of 21.30 ± 1.58 cover/m^2.

The 2025 assessment of 2015 rehabilitation areas enabled a review of progress at ten years. Overall, the following results using the previous approach and then re-aligning with the proposed draft changes to the Completion Criteria for rehabilitation areas in State forest areas (as supplied by South32 in 2026):

- Mean trees of 700.0 ± 21.9 trees/ha met the 500-700 trees/ha. This exceeds the >200 mature trees/ha as in the draft updated completion criterion.
- Mean trees of 320.50 ± 78.37 trees/ha met the >200 mature *Eucalyptus marginata* and *Corymbia calophylla* trees/ha; although several pits may need some management (MN34/10 and SW47).
- Mean native species richness exceeds the 47.00 ± 2.89 native plant species/plot (80m^2). This is similar to the forest monitoring plots of 55.38 native plants/plot (80m^2), and meets the ≥40% of alive native, annual/perennial, understorey species (excluding trees)/ 80m^2 .
- Mean introduced species richness was 3.33 ± 0.76 native plant species/plot (80m^2) which is relatively high, although lower than in the 15 month and 5-year old rehabilitation areas. As most of the introduced species are annual species, results consistently reflect a decline in introduced species as the native species start to dominate the rehabilitation areas.
- No declared weeds were recorded in the 2015 rehabilitation areas in 2025.
- Mean native plant densities in the 2015 rehabilitation areas in 2025 was 5.70 ± 0.51/m2 which is approximately 50% of the overall forest monitoring plots of 11.99 ± 0.31/m2.
- Mean native foliage cover in the 2015 rehabilitation areas in 2025 was 40.51 ± 2.11 cover/m^2 and a such exceeds the mean foliage cover in the forest monitoring plots of 21.30 ± 1.58.

The 2025 assessment of 2005 rehabilitation areas enabled a review of progress at twenty years. Overall, the following results using the previous approach and then re-aligning with the proposed draft changes to the Completion Criteria for rehabilitation areas in State forest areas (as supplied by South32 in 2026):

- Mean trees of 775.0 ± 81.98 trees/ha met the 500-700 trees/ha. This exceeds the >200 mature trees/ha as in the draft updated completion criterion.
- Mean trees of 562.50 ± 166.50 trees/ha met the >200 mature *Eucalyptus marginata* and *Corymbia calophylla* trees/ha.
- Mean native species richness exceeds the 49.50 ± 3.27 native plant species/plot (80m^2). This is similar to the forest monitoring plots of 55.38 native plants/plot (80m^2), and meets the ≥40% of alive native, annual/perennial, understorey species (excluding trees)/ 80m^2 .
- Mean introduced species richness was 1.33 ± 0.37 plant species/plot (80m^2) which is relatively high, although lower than in the 15 month, 5-year old and 10-year old rehabilitation areas. As most of the introduced species are annual species, results consistently reflect a decline in introduced species as the native species start to dominate the rehabilitation areas.
- No declared weeds were recorded in the 20015 rehabilitation areas in 2025.
- Mean native plant densities in the 2005 rehabilitation areas in 2025 was 5.12 ± 0.49/m2 which is approximately 50% of the overall forest monitoring plots of 11.99 ± 0.31/m2.
- Mean native foliage cover in the 2005 rehabilitation areas in 2025 was 39.88 ± 3.08 cover/m^2 and a such exceeds the mean foliage cover in the forest monitoring plots of 21.30 ± 1.58 cover/m2, and also the updated draft completion criteria of 35% of alive cover/m^2.

The 2025 assessment of 1995 rehabilitation areas enabled a review of progress at thirty years. Overall, the following results using the previous approach and then re-aligning with the proposed draft changes to the Completion Criteria for rehabilitation areas in State forest areas (as supplied by South32 in 2026):

- Mean trees of 845.83 ± 184.10 trees/ha met the 500-700 trees/ha. This exceeds the >200 mature trees/ha as in the draft updated completion criterion.
- Mean trees of 615.00 ± 180.03 trees/ha met the >200 mature *Eucalyptus marginata* and *Corymbia calophylla* trees/ha.
- Mean native species richness exceeds the 35.60 ± 4.63 native plant species/plot (80m^2) in the State forest areas. This is similar to the forest monitoring plots of 55.38 native plants/plot (80m^2), and meets the ≥40% of alive native, annual/perennial, understorey species (excluding trees)/ 80m^2 providing the standard error is taken into account.
- Mean introduced species richness was 1.00 ± 0.55 native plant species/plot (80m^2) which is lower than in the 15 month, 5-year, 10-year and 20-year old rehabilitation areas. As most of the introduced species are annual species, results consistently reflect a decline in introduced species as the native species start to dominate the rehabilitation areas.
- No declared weeds were recorded in the 2015 rehabilitation areas in 2025.
- Mean native plant densities in the 1995 rehabilitation areas in 2025 was 6.16 ± 0.39/m2 (excluding the one private property plot), which is approximately 50% of the overall forest monitoring plots of 11.99 ± 0.31/m2.
- Mean native foliage cover in the 1995 rehabilitation areas in 2025 was 36.58 ± 2.35 cover/m^2 (excluding the plot on the private property) and a such exceeds the mean foliage cover in the forest monitoring plots of 21.30 ± 1.58 cover/m2 and also the updated draft completion criteria of 35% of alive cover/m^2 (providing standard error taken into account).

Of the different ages of rehabilitation monitored this year, the tree numbers exceeded the natural mining area density (330 trees/ ha), Worsley Alumina Pty Ltd 1985 (Phase Two studies). Trends observed across all years and rehabilitation monitoring times include; an increase in tree density coinciding with a decrease in seedling density, an increase in tree mortality rate and a decline in tree health as the rehabilitation areas age. This indicates that many seedlings are reaching maturity over time and developing into trees, further increasing tree density. However, seedling density values fluctuate over any given period of time, which is indicative of their sensitivity to environmental conditions and competition.

7. RECOMMENDATIONS

In response to results of the 2025 monitoring assessment of mine-pit rehabilitation areas at the Boddington Bauxite Mine, it is recommended:

- Species with high establishment rates should not be removed from the seed list unless the species are dominating the understorey and excluding the establishment of other species (e.g. *Acacia pulchella* and *Acacia celastrifolia*). As this is a product of topsoil sources as well as handling, time and the species involved will change year to year.

- Consideration be given to reducing the density of *Acacia celastrifolia* and *Acacia pulchella* within younger rehabilitation before seed-set to potentially reduce density and minimise the level of senescence later and prevent further germination from topsoil.

- Implementation of an introduced species management plan for those pits suffering from severe infestations would greatly promote the development of healthy ecosystems.

- In relation to the understorey species, the proposed comparison with native forest areas poses challenges as some of the parameters in the different forest areas vary and therefore whilst minimums may be desirable it may also be worth considering ranges when comparing with forest areas.

- In relation to the proposed draft completion criteria, it may be worth reducing the subtle variations between the different ages of rehabilitation. The key lessons from the historical comparisons should highlight key trends in both native and introduced species and the difficulties of assessing some parameters such as bark depth.

- Continue to monitor rehabilitated areas to further understand the progression of those areas and the development and health of communities within them, in order to assess the similarity with adjacent forest communities through the different phases of rehabilitation. This will assist in fostering sustainable ecosystems for the future.

8. ACKNOWLEDGEMENTS

The authors would like to thank Paul Bullock and Kristion Narducci from South32 Worsley Alumina for their assistance with this project.

9. LIST OF PERSONNEL

The following Mattiske Consulting Pty Ltd personnel were involved in this project:

Name	Position	Project Involvement	Flora Collection Permit
Dr E. M. Mattiske	Managing Director & Principal Ecologist	Planning, management and reporting	N/A
Mr A Pereira	Senior Botanist	Fieldwork	FB62000145-7
Mr L Rowles	Senior Botanist	Fieldwork, statistical analysis and report preparation	FB62000020-7
Ms J Crane	Experienced Botanist	Fieldwork	FB62000671-2
Mr J J Werny	Experienced Botanist	Fieldwork	FB62000587-3
Ms K Tribbeck	Experienced Botanist	Fieldwork	FB62000467-4
Ms M Mrasic	Experienced Botanist	Fieldwork	FB62000616-3
Ms Z Brennan	Experienced Botanist	Fieldwork	FB62000649-2
Mr V Ferguson	Experienced Botanist	Fieldwork	FB62000711-2
Mr K Rahman	Biologist	Fieldwork	FB62000576
Ms K Smith	Ecologist	Assisting with Data Collation	N/A
Ms J. Wescombe	Ecologist	Assisting with Data Collation and reporting	N/A

10. REFERENCES

Abbott, I., Dell, B. and Loneragan, O. (1989)
The Jarrah Plant. In Dell, B., Havel, J. J. and Malajczuk, N. (Eds.) *The Jarrah Forest. Kluwer Academic Publishers,* Dordrecht 23 – 40.

Ball, P. J. and Giles, R. J. (1985)
The Mt. Saddleback Bauxite Deposit South Western Australia. In: Proceedings of the 3rd International Conference on Laterisation Processes, Japan, Tokyo.

Beard, J. S. (1990)
Plant Life of Western Australia. Kangaroo Press, Kenthurst NSW.

Biodiversity Conservation Act 2016

Biosecurity and Agriculture Management Act 2007

Biosecurity and Agriculture Management Regulations 2013

Bright, D. (1995)
Determination of Appropriate Sample Size in Assessing Rehabilitated Vegetation on Bauxite Mined Land in the Northern Jarrah Forest, Boddington. Unpublished report prepared for Worsley Alumina Pty Ltd.

Brower, J. E. and Zar, J. R. (1977)
Field and Laboratory Methods for General Ecology. W.M.C. Brown Company Publishers, Iowa.

Bureau of Meteorology (2026)
Climate data online, Commonwealth of Australia. Available from: http://www.bom.gov.au/climate/data/?ref=ftr.

Churchill, D. M. (1961)
The Tertiary and Quarternary vegetation and climate in relation to the living flora in south Western Australia. Ph. D. Thesis, UWA.

Churchill, D. M. (1968)
The distribution and prehistory of Eucalyptus diversicolor F. Muell, E. marginata Donn Ex Sm., and E. calophylla R. Br. in relation to rainfall. Aust. J. Bot. 16, 125 – 151.

Department of Climate Change, Energy, the Environment and Water (2026)
EPBC Act list of threatened flora, Commonwealth of Australia. Available from: http://www.environment.gov.au/cgi-bin/sprat/public/publicthreatenedlist.pl?wanted= flora.

Department of Biodiversity, Conservation and Attractions (2019)
Conservation codes for Western Australian flora and fauna, January 2019. Available from: https://www.dpaw.wa.gov.au/images/documents/plants-animals/threatened-species/Listings/Conservation%20code%20definitions.pdf.

Department of Biodiversity, Conservation and Attractions (2026a)
Threatened and Priority Flora List. Available from: https://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-plants.

Department of Biodiversity, Conservation and Attractions (2026b)
Priority Ecological Communities for Western Australia. Available from: https://www.dpaw.wa.gov.au/images/documents/plants-animals/threatened-species/Listings/Priority%20ecological%20communities%

Department of Biodiversity, Conservation and Attractions (2026c)
List of Threatened Ecological Communities endorsed by the Western Australian Minister for Environment. Available from: https://www.dpaw.wa.gov.au/images/plants-animals/threatened-species/threatened_ecological_communities_endorsed_by_the_minister_for_the_environment

Department of Environment and Conservation (2013)
Definitions, categories and criteria for threatened and priority ecological communities, Government of Western Australia. Available from: https://www.dpaw. wa.gov .au/images/plants-animals/threatened-species/definitions_categories_and_criteria_for_threatened_and_priority_ ecological_communities.pdf

Department of Primary Industries and Regional Development (2026).
Western Australian Organism List. Available from: https://www.agric.wa.gov.au/organisms

Diels, L. (1906)
Die Pflanzenwelt von West Australien südlich des Wendeskreises. In: Die Vegetation der Erde (Engler A. and Drude O., eds.) W. Engelman, Leipzig.

Environmental Protection Authority (2004)
Guidance for the assessment of environmental factors – terrestrial flora and vegetation surveys for environmental impact assessment in Western Australia, No. 51, Environmental Protection Authority, Western Australia.

Environmental Protection Authority (2016a)
Environmental Factor Guideline – Flora and Vegetation, Environmental Protection Authority, Western Australia.

Environmental Protection Authority (2016b)
Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment, Environmental Protection Authority, Western Australia.

Environmental Protection Act 1986

Environment Protection and Biodiversity Conservation Act 1999

Environmental Protection (Environmentally Sensitive Areas) Notice 2005

French, D. D. (1994)
Hierarchical Richness Index (HRI): A Simple Procedure for Scoring 'Richness' for use With Grouped Data. Biological Conservation 69, 207-212.

George, A. S. (ed.) (1989)
Flora of Australia Volume 3, Hamamelidales to Casuarinales. Australian Government Publishing Service, Canberra, ACT.

Gentilli, J. (1989)
Climate of the Jarrah Forest. In: Dell, B. Havel, J.J. and Malajczuk, N. (eds), The Jarrah Forest. Kluwer Academic Publishers, Dordrecht. 23 – 40.

Havel, J. J. (1975a)
Site-vegetation mapping in the Northern Jarrah Forest (Darling Range). I. Definition of site vegetation types. Bull. For. Dept. West. Aust. **86**

Havel, J. J. (1975b)
Site-vegetation mapping in the Northern Jarrah Forest (Darling Range). II. Location and mapping of site-vegetation types. Bull. For. Dept. West. Aust. **87**

Kimber, P.C. (1974)
The root system of Jarrah (Eucalyptus marginata). Research Paper 10, Forests Department of Western Australia, Perth, WA.

Koch, J. M. and Samsa, G. P. (2007)
Restoring Jarrah Forest Trees after Bauxite Mining in Western Australia. *Restoration Ecology* 15 (4) (Supplement) s17 – s25.

Lange, R. T. (1960)
Rainfall and soil control of tree species distribution around Narrogin, Western Australia. M.Sc. Thesis, UWA.

Mattiske, E. M. and Associates (1989)
Assessment of 1986, 1987 and 1988 Mine-Pit Rehabilitation Areas. Unpublished report prepared for Worsley Alumina Pty Ltd.

Mattiske, E. M. and Associates (1990b)
Assessment of the 1986, 1987, 1988 and 1989 Mine-Pit Rehabilitation Areas. Unpublished report prepared for Worsley Alumina Pty Ltd.

Mattiske, E. M. and Havel, J. J. (1998)
Vegetation Mapping in the South West of Western Australia. Department of Conservation and Land Management. Perth, Western Australia.

Mattiske Consulting Pty Ltd (2000)
Monitoring Tree Establishment in the 1990, 1993 and 1996 Mine-pit Rehabilitation Areas, Boddington Bauxite Mine. Unpublished report prepared for Worsley Alumina Pty Ltd.

Mattiske Consulting Pty Ltd (2007)
Monitoring Tree Establishment in 1987, 1992, 1997, 2000 and 2003 Mine-Pit Rehabilitation Areas. Unpublished report prepared for Worsley Alumina Pty Ltd.

Mattiske Consulting Pty Ltd (2010)
Monitoring Tree Establishment in 1990, 1995, 2000, 2003 and 2006 Mine-Pit Rehabilitation Areas. Unpublished report prepared for BHP Billiton Worsley Alumina Pty Ltd.

Mattiske Consulting Pty Ltd (2011)
Monitoring Tree Establishment in the 1986, 1991, 1996, 2001, 2004 and 2007 Mine-pit Rehabilitation Areas and Forest Control Plots, Boddington Bauxite Mine. Unpublished report prepared for Worsley Alumina Pty Ltd.

Mattiske Consulting Pty Ltd (2012)
Monitoring Tree Establishment in 1987, 1992, 1997, 2002, 2005 and 2008 Mine-Pit Rehabilitation Areas. Unpublished report prepared for BHP Billiton Worsley Alumina Pty Ltd.

Mattiske Consulting Pty Ltd (2013)
Monitoring Tree Establishment in 1988, 1993, 1998, 2003, 2006 and 2009 Mine-Pit Rehabilitation Areas. Unpublished report prepared for BHP Billiton Worsley Alumina Pty Ltd.

Mattiske Consulting Pty Ltd (2014)
Monitoring Tree Establishment in 1989, 1994, 1999, 2004, 2007, 2010 and 2013 Mine-Pit Rehabilitation Areas. Unpublished report prepared for BHP Billiton Worsley Alumina Pty Ltd.

Mattiske Consulting Pty Ltd (2015)
Spring Assessment of 1990, 1995, 2000, 2005, 2008, 20011 and 2014 Mine-Pit Rehabilitation Areas, Boddington Bauxite Mine. Unpublished report prepared for South32 Worsley Alumina Pty Ltd.

Mattiske Consulting Pty Ltd (2016)
Spring Assessment of 1986, 1991, 1996, 2001, 2006, 2009, 2012 and 2015 Mine-Pit Rehabilitation Areas, Boddington Bauxite Mine. Unpublished report prepared for South32 Worsley Alumina Pty Ltd.

Mattiske Consulting Pty Ltd (2017)
Monitoring Tree Establishment in 1987, 1992, 1997, 2002, 2007, 2010, 2013 and 2016 Mine-Pit Rehabilitation Areas. Unpublished report prepared for BHP Billiton Worsley Alumina Pty Ltd.

Mattiske Consulting Pty Ltd (2018)
Spring Assessment of 1988, 1998, 2008, 2013 and 2017 Mine-Pit Rehabilitation Areas, Boddington Bauxite Mine. Unpublished report prepared for South32 Worsley Alumina Pty Ltd.

Mattiske Consulting Pty Ltd (2019)
Spring Assessment of 1989, 1999, 2009, 2014 and 2018 Mine-Pit Rehabilitation Areas, Boddington Bauxite Mine. Unpublished report prepared for South32 Worsley Alumina Pty Ltd.

Mattiske Consulting Pty Ltd (2020)
Spring Assessment of 1990, 2000, 2010, 2015 and 2019 Mine-Pit Rehabilitation Areas, Boddington Bauxite Mine. Unpublished report prepared for South32 Worsley Alumina Pty Ltd.

Mattiske Consulting Pty Ltd (2021)
Spring Assessment of 1991, 2001, 2011, 2016 and 2020 Mine-Pit Rehabilitation Areas, Boddington Bauxite Mine. Unpublished report prepared for South32 Worsley Alumina Pty Ltd.

Mattiske Consulting Pty Ltd (2022)
Spring Assessment of 1992, 2002, 2012, 2017 and 2021 Mine-Pit Rehabilitation Areas, Boddington Bauxite Mine. Unpublished report prepared for South32 Worsley Alumina Pty Ltd.

Mattiske Consulting Pty Ltd (2023)
Spring Assessment of 1993, 2003, 2013, 2018 and 2022 Mine-Pit Rehabilitation Areas, Boddington Bauxite Mine. Unpublished report prepared for South32 Worsley Alumina Pty Ltd.

Mattiske Consulting Pty Ltd (2021)
Assessment of Flora and Vegetation on Worsley Mine Expansion Primary Assessment Area. Unpublished report prepared for South32 Worsley Alumina Pty Ltd.

Mattiske Consulting Pty Ltd (2024)
Spring Assessment of 1994, 2004, 2014, 2019 and 2023 Mine-Pit Rehabilitation Areas, Boddington Bauxite Mine. Unpublished report prepared for South32 Worsley Alumina Pty Ltd.

Mullins, R. G., Koch, J. M. and Ward, S. C. (2002)
Practical method of germination for a key Jarrah forest species: Snottygobble (Persoonia longifolia). Ecological Management and Restoration 3, 297 – 103.

Speck, N. H. (1958)
The vegetation of the Darling-Irwin botanical districts and an investigation of the distribution of the family Proteaceae in south-western Western Australia. Ph.D. Thesis, UWA.

Thiele, K. R. (2019).
A revision of the Hibbertia commutata (Dilleniaceae) species group. *Australian Systematic Botany*, *32*(1), 71-109. https://doi.org/10.1071/SB18007

Turnbull, J. W. and Martensz, P. N. (1983)
Seed Production, Collection and Germination. In: *Casuarinaceae - Casuarina Ecology Management and Utilisation*: Proceedings of an International Workshop, Canberra, Australia. CSIRO, 1983, Melbourne.

Vlahos, S., Bastow, B. B. and Rayner, G. A. (1999)
Bauxite mine rehabilitation in the northern Jarrah forest. In: Proceedings of Fifth International Alumina Quality Workshop. Bunbury, Western Australia.

Western Australian Herbarium (1998-)
FloraBase – the Western Australian Flora, Department of Parks and Wildlife. Available from: https://florabase.dpaw.wa.gov.au. December 2020.

Worsley Alumina Pty Ltd (1985)
Worsley Alumina Project. Flora and Fauna Studies, Phase Two. Worsley Alumina Pty Ltd, Perth, Western Australia.

Worsley Alumina Pty Ltd (1999)
Worsley Alumina Boddington Gold Mine Project. Flora and Fauna Studies. Worsley Alumina Pty Ltd. Perth, Western Australia.

APPENDIX A1: THREATENED AND PRIORITY FLORA DEFINITIONS

Under section 179 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), **threatened flora** are categorised as extinct, extinct in the wild, critically endangered, endangered, vulnerable and conservation dependent (Table A1.1).

Table A1.1 Federal definition of threatened flora species

Note: Adapted from section 179 of the EPBC Act.

CODE	CATEGORY	DEFINITION
Ex	**Extinct**	Species which at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.
ExW	**Extinct in the Wild**	Species which is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
CE	**Critically Endangered**	Species which at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
E	**Endangered**	Species which is not critically endangered and it is facing a very high risk of extinction in the wild in the immediate or near future, as determined in accordance with the prescribed criteria.
V	**Vulnerable**	Species which is not critically endangered or endangered and is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
CD	**Conservation Dependent**	Species which at a particular time if, at that time, the species is the focus of a specific conservation program, the cessation of which would result in the species becoming vulnerable, endangered or critically endangered within a period of 5 years.

The *Biodiversity Conservation Act 2016 - WA* (BC Act) provides for (amongst other things) the protection of flora that is facing an extremely high risk of extinction in the wild in the immediate, near or medium-term future in Western Australia under Part 10 (Division 2).

Threatened flora are listed in the *Biodiversity Conservation (Listing of Native Species) (Flora) Order 2023*; Department of Biodiversity, Conservation and Attractions (DBCA 2026a), and are categorised under Division 1 (threatened species – critically endangered), Division 2 (threatened species - endangered), and Division 3 (threatened species – vulnerable)**.** A flora species is defined as **threatened flora** if it is facing an extremely high risk of extinction in the wild in the immediate, near or medium-term future, pursuant to sections 20, 21 and 22 of the BC Act. Threatened species are categorised as critically endangered, endangered, and vulnerable (Table A1.2).

Table A1.2 State definition of threatened flora species

Note: Adapted from the BC Act and DBCA (2026b).

CODE	CATEGORY	DEFINITION
CR	**Critically endangered**	Species considered to be facing an extremely high risk of becoming extinct in the wild (listed under Schedule 1, Division 1 of the *Biodiversity Conservation (Listing of Native Species) (Flora) Order 2023*).
EN	**Endangered**	Species considered to be facing a very high risk of becoming extinct in the wild (listed under Schedule 1 Division 2 of the *Biodiversity Conservation (Listing of Native Species) (Flora) Order 2023*).
VU	**Vulnerable**	Species considered to be facing a high risk of becoming extinct in the wild (listed under Schedule 1 Division 3 of the *Biodiversity Conservation (Listing of Native Species) (Flora) Order 2023*).

Priority flora species are defined as "possibly threatened species that do not meet the criteria for listing under the BC Act because of insufficient survey or are otherwise data deficient" or species that are "adequately known, meet criteria for near threatened, or are rare but not threatened, or that have been recently removed from the threatened species list or are conservation dependent for other than taxonomic reasons" (DBCA 2026b). Priority species are not afforded the same level of protection under state or federal legislation as the listed Threatened species, however are considered significant under the Environmental Protection Authority's *Environmental Factor Guideline: Flora and Vegetation* (EPA 2016a). The DBCA categorises priority flora into four categories: Priority 1; Priority 2, Priority 3 and Priority 4 (Table A1.3).

Table A1.3: State definition of priority flora species

Note: Adapted from the DBCA (2026b).

CODE	CATEGORY	DEFINITION
P1	**Priority 1:** Poorly-known species	Known from one or a few locations (< 5) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation; or are otherwise under threat of habitat destruction or degradation. In urgent need of further survey.
P2	**Priority 2:** Poorly-known species	Known from one or a few locations (< 5). Some occurrences are on lands managed primarily for nature conservation. In urgent need of further survey.
P3	**Priority 3:** Poorly-known species	Known from several locations and the species does not appear to be under imminent threat; or from few but widespread locations with either a large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. In need of further survey.
P4	**Priority 4:** Rare, Near Threatened, and other species in need of monitoring	**a) Rare -** Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These species are usually represented on conservation lands. **b) Near Threatened -** Species that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable. **c) Other -** Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

APPENDIX A2: THREATENED AND PRIORITY ECOLOGICAL COMMUNITY DEFINITIONS

`

Under section 181 of the EPBC Act, threatened ecological communities are categorised as critically endangered, endangered and vulnerable (Table A2.1).

Table A2.1 Federal definition of threatened ecological communities

Note: Adapted from section 181 and section 182 of the EPBC Act.

CATEGORY	DEFINITION
Critically Endangered	If, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future.
Endangered	If, at that time, it is not critically endangered and is facing a very high risk of extinction in the wild in the near future.
Vulnerable	If, at that time, it is not critically endangered or endangered, and is facing a high risk of extinction in the wild in the medium-term future.

Threatened ecological communities (TECs) are listed in the *Biodiversity Conservation (Threatened Ecological Communities) Order 2023* (under Part 2, Division 2, of the BC Act; DBCA 2026c). An ecological community is defined as **threatened** if it is facing an extremely high risk of collapse in the immediate, near or medium-term future, pursuant to sections 28, 29 and 30 of the BC Act. Threatened ecological communities are categorised as critically endangered, endangered, and vulnerable (Table A2.2).

Table A2.2 State definition of threatened ecological communities

Note: Summarised from the BC Act and the DBCA (2026c).

CODE	CATEGORY	DEFINITION
CO	**Collapsed ecological communities**	An ecological community is eligible for listing as a collapsed ecological community if either: **1.** there is no reasonable doubt that the last occurrence of the ecological community has collapsed; or **2.** the ecological community has been so extensively modified throughout its range that no occurrence of it is likely to recover its species composition and/or structure
CR	**Critically Endangered**	An ecological community is eligible for listing as critically endangered if it is considered to be facing an extremely high risk of becoming eligible for listing as a collapsed ecological community in the immediate future when the best available evidence indicates that it meets **any** of the following criteria: **1.** The geographic distribution has been reduced by at least 80% or is less than 2000 km^2 for a single community **or** there are less than 2 areas of at least 100 km^2 **and** there is observed or inferred decline or threatening processes causing further decline; or **2.** Environmental degradation has occurred based on change in an abiotic or biotic variable affecting at least 80% of the extent of the ecological community **3.** Quantitative analysis that estimates the probability of ecological community collapse to be: at least 50% within 50 years.
EN	**Endangered**	An ecological community is eligible for listing in the category of endangered if it is considered to be facing a very high risk of becoming eligible for listing as a collapsed ecological community in the near future when the best available evidence indicates that it meets any of the following criteria: **1.** The geographic distribution has been reduced by, at least 50% or the geographic distribution is less than 20,000 km^2 for a single community **or** there are less than 20 areas of at least 100 km^2 **and** there is observed or inferred decline or threatening processes causing further decline; **2.** Environmental degradation has occurred based on change in an abiotic or biotic variable affecting either at least 50% of the extent of the ecological community; **3.** Quantitative analysis that estimates the probability of ecological community collapse to be: at least 20% within 50 years.
VU	**Vulnerable**	An ecological community is eligible for listing in the category of vulnerable at if it is considered to be facing a high risk of becoming eligible for listing as a collapsed ecological community in the medium-term future when the best available evidence indicates that it meets any of the following criteria: **1.** The geographic distribution has been reduced by, at least 30% or the geographic distribution is less than 50,000 km^2 for a single community **or** there are less than 50 areas of at least 100 km^2 **and** there is observed or inferred decline or threatening processes causing further decline; or **2.** Environmental degradation has occurred based on change in an abiotic or biotic variable affecting either at least 30% of the extent of the ecological community; or **3.** Quantitative analysis that estimates the probability of ecological community collapse to be at least 10% within 100 years.

Priority ecological communities (PECs) are defined as possible threatened ecological communities that do not meet the stringent survey criteria for the assessment of threatened ecological communities, and are listed by DBCA (2026d) in the *Priority Ecological Communities for Western Australia (2026)*. Similarly, to priority flora, PECs are not afforded legislative protection, however are considered significant under the Environmental Protection Authorities (EPA 2016a) *Environmental Factor Guideline: Flora and Vegetation*. The DBCA categorises PECs into five categories: Priority 1; Priority 2, Priority 3, Priority 4 and Priority 5 (Table A2.3).

Table A2.3 State definition of priority ecological communities

Note: Adapted from DBCA (2026d).

CODE	CATEGORY	DEFINITION
P1	**Priority 1** (Poorly known ecological communities)	Ecological communities that are known from very few occurrences with a very restricted distribution (generally ≤5 occurrences or a total area of ≤100 ha). Occurrences are believed to be under threat either due to limited extent, or being on lands under immediate threat or for which current threats exist. Communities may be included if they are well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range
P2	**Priority 2** (Poorly known ecological communities)	Communities that are known from few occurrences with a restricted distribution (generally ≤10 occurrences or a total area of ≤200 ha). At least some occurrences are not under immediate threat (within approx. 10 yrs.) of destruction or degradation. Communities may be included if they are well known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under threat from known threatening processes.
P3	**Priority 3** (Poorly known ecological communities)	Communities may be included if they are well known from several localities but do not meet adequacy of survey requirements and/or are not well defined, and known threatening processes exist that could affect them. This category includes three sub-categories: (i) Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation. (ii) Communities known from a few widespread occurrences, which are either large or with significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat (within approx. 10 yrs.). (iii) Communities made up of large, and/or widespread occurrences, that may or may not be represented in the reserve system, but are under threat of modification across their range from processes such as grazing by, inappropriate fire regimes, clearing, hydrological change, etc
P4	**Priority 4** (Ecological communities that are adequately known, rare but not threatened or that have been recently removed from the threatened list.)	Ecological communities that are adequately known and either rare but not threatened, near threatened, or have recently been removed from the threatened list. These communities require regular monitoring. (i) Rare: ecological communities known from few occurrences that are considered to have been adequately surveyed, and that are not currently threatened, but could be if present circumstances change. These communities are usually represented on conservation lands. (ii) Near threatened: ecological communities that are considered to have been adequately surveyed and that do not qualify as conservation dependent, but that are close to qualifying for a higher threat category. (iii) Ecological communities that have been removed from the list of threatened communities during the past five years.
P5	**Priority 5** (Conservation Dependent ecological communities)	Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.

APPENDIX A3: CATEGORIES AND CONTROL MEASURES OF DECLARED PEST (PLANT) ORGANISMS IN WESTERN AUSTRALIA

Section 22 of Western Australia's *Biosecurity and Agriculture Management Act 2007* (BAM Act) makes provision for a plant taxon to be listed as a declared pest organism in respect to parts of, or the entire State. According to the BAM Act, a declared pest is defined as a prohibited organism (section 12), or an organism for which a declaration under section 22 (2) of the BAM Act is in force.

Under the BAM Act, declared pest plants are placed in one of three control categories, C1 (exclusion), C2 (eradication) or C3 (management), which determines the measures of control which apply to the declared pest (Table A4.1). The current listing of declared pest organisms and their control category is through the *Western Australian Organism List* (Department of Primary Industries and Regional Development [DPIRD] 2026).

Table A3.1 Categories and control measures of declared pest (plant) organisms

Note: Adapted from BAM Act.

CONTROL CATEGORY	CONTROL MEASURES
C1 (Exclusion) '(a) Category 1 (C1) — Exclusion: if in the opinion of the Minister introduction of the declared pest into an area or part of an area for which it is declared should be prevented.' Pests will be assigned to this category if they are not established in Western Australia and control measures are to be taken, including border checks, in order to prevent them entering and establishing in the State.	In relation to a category 1 declared pest, the owner or occupier of land in an area for which an organism is a declared pest or a person who is conducting an activity on the land must take such of the control measures specified in subregulation (1) as are reasonable and necessary to destroy, prevent or eradicate the declared pest.
C2 (Eradication) '(b) Category 2 (C2) — Eradication: if in the opinion of the Minister eradication of the declared pest from an area or part of an area for which it is declared is feasible.' Pests will be assigned to this category if they are present in Western Australia in low enough numbers or in sufficiently limited areas that their eradication is still a possibility.	In relation to a category 2 declared pest, the owner or occupier of land in an area for which an organism is a declared pest or a person who is conducting an activity on the land must take such of the control measures specified in subregulation (1) as are reasonable and necessary to destroy, prevent or eradicate the declared pest.
C3 (Management) '(c) Category 3 (C3) — Management: if in the opinion of the Minister eradication of the declared pest from an area or part of an area for which it is declared is not feasible but that it is necessary to: **(i)** alleviate the harmful impact of the declared pest in the area; or **(ii)** reduce the number or distribution of the declared pest in the area; or **(iii)** prevent or contain the spread of the declared pest in the area.' Pests will be assigned to this category if they are established in Western Australia but it is feasible, or desirable, to manage them in order to limit their damage. Control measures can prevent a C3 pest from increasing in population size or density or moving from an area in which it is established into an area which currently is free of that pest.	In relation to a category 3 declared pest, the owner or occupier of land in an area for which an organism is a declared pest or a person who is conducting an activity on the land must take such of the control measures specified in subregulation (1) as are reasonable and necessary to: **(a)** alleviate the harmful impact of the declared pest in the area for which it is declared; or **(b)** reduce the number or distribution of the declared pest in the area for which it is declared; or **(c)** prevent or contain the spread of the declared pest in the area for which it is declared.

APPENDIX A4: OTHER DEFINITIONS

Environmentally sensitive areas

Environmentally sensitive areas are declared by the State Minister under section 51B of the *Environmental Protection Act 1986* (EP Act) and are listed in the *Environmental Protection (Environmentally Sensitive Areas) Notice 2005*, gazetted 8 April 2005. Specific environmentally sensitive areas relevant to this report include: a defined wetland and the area within 50 metres of the wetland; the area covered by vegetation within 50 metres of rare flora; the area covered by a threatened ecological community; a Bush Forever site – further areas and information are described in the *Environmental Protection (Environmentally Sensitive Areas) Notice 2005*.

Conservation significant flora

Under the *Environmental Factor Guideline: Flora and Vegetation* (EPA 2016a), flora may be considered significant for a range of reasons, including, but not limited to the following:

- being identified as threatened or priority species;
- locally endemic or associated with a restricted habitat type (e.g. surface water or groundwater dependent ecosystems);
- new species or anomalous features that indicate a potential new species;
- representative of the range of a species (particularly, at the extremes of range, recently discovered range extensions, or isolated outliers of the main range);
- unusual species, including restricted subspecies, varieties or naturally occurring hybrids; or
- relictual status, being representative of taxonomic groups that no longer occur widely in the broader landscape.

Conservation significant vegetation

Under the *Environmental Factor Guideline: Flora and Vegetation* (EPA 2016a), vegetation may be considered significant for a range of reasons, including, but not limited to the following:

- being identified as threatened or priority ecological communities;
- restricted distribution;
- degree of historical impact from threatening processes;
- a role as a refuge; or
- providing an important function required to maintain ecological integrity of a significant ecosystem.

APPENDIX B: SUMMARY OF MONIOTRING RECORDING TIMES FOR PLOTS IN THE FOREST AND REABILITATION AREAS

Monitoring Years		1995	1996	1998	1999	2002	2004	2005	2006	2007	2008	2009	2010	2011	2012	2014	2015	2016	2019	2020	2021	2022	2023	2024	2025
Forest Monitoring		x	x		x		x	x	x	x	x	x	x	x		x		x				x	x	x	x
FMP091	FMP091	x	x		x		x	x		x	x					x		x							x
FMP108	FMP108								x			x	x	x		x		x				x		x	x
FMP110	FMP110									x	x	x	x	x		x									x
FMP112	FMP112											x	x			x		x				x	x	x	x
FMP114	FMP114										x	x	x	x		x		x				x	x		x
MMP	MMP									x												x	x		x
MMP08A	MMP08A									x												x	x		
MMP08A-V2	MMP08A-V2																								x
QMP	QMP			x															x			x			x
QMP01	QMP01			x															x			x			x
QMP02	QMP02			x															x			x			x
1995 Rehabilitation Areas			x		x	x		x					x				x								x
FAW	MP09		x		x	x		x																	x
N10(A)	MP03		x																						x
NE02	MP07		x										x				x								x
NE05	MP08		x		x	x		x					x				x								x
SE02	MP10		x		x	x		x					x				x								x
SE02	MP11		x					x					x				x								x
2005 Rehabilitation Areas									x			x			x		x								x
N10.6	MP02								x			x			x		x								x
N18	MP06								x			x													x
NSS	MP01								x			x			x		x								x
SE	MP15								x								x								x
SE13	MP12								x			x			x		x								x
SW01	MP10								x			x			x		x								x
2015 Rehabilitation Areas																		x		x					x
ME03-22	MP03																	x							x
MN34/10-V2	MP07-V2																								x
SW21	MP11																	x							x
SW35	MP14																	x							x
SW47	MP15																	x		x					x
WS08	MP20																	x		x					x
2020 Rehabilitation Areas																					x				x
ME12	MP07																				x				x
MNE35	MP05																				x				x
MS09	MP15																				x				x
SW107	MP25																				x				x
WM052	MP33																								x
WM056	MP28																								x

APPENDIX B: SUMMARY OF MONIOTRING RECORDING TIMES FOR PLOTS IN THE FOREST AND REABILITATION AREAS

Monitoring Years		1995	1996	1998	1999	2002	2004	2005	2006	2007	2008	2009	2010	2011	2012	2014	2015	2016	2019	2020	2021	2022	2023	2024	2025
2024 Rehabilitation Areas																									
MW40	MP02																								x
NO08	MP03																								x
QU02	MP04																								x
QU02	MP05																								x
QU02	MP06																								x
QU02	MP07																								x
QU02	MP08																								x
QU02_S5	MP09																								x
QU03	MP10																								x
QU03	MP11																								x
QU03	MP12																								x
QU03	MP13																								x
QU03	MP14																								x
QU03	MP15																								x
SE108	MP16																								x
SE108	MP17																								x
SW16	MP18																								x
SW16	MP19																								x
SW52	MP20																								x
WM048	MP21																								x
WM052-S18	MP22																								x
WM055-S3	MP23																								x
WM055-S3	MP24																								x
WM055-S3	MP25																								x
WM055-S3-DR	MP26																								x
WM055-S3-DR	MP27																								x
WM056-S11	MP28																								x
WM056-S11	MP29																								x
WM056-S6	MP30																								x
WM056-S6	MP31																								x
WM056-S6	MP32																								x
WM056-S6	MP33																								x
WM056-S6	MP34																								x
WM056-S6	MP35																								x
WM056-S6	MP36																								x
WM056-S6	MP37																								x
WS09	MP38																								x
WS09	MP39																								x
WS2E	MP40																								x

APPENDIX C: FREQUENCY OF 2025 RECORDS OF VASCULAR FLORA IN REHABILITATION YEARS

Note: * denotes introduced species; P1, P3 and P4 denote Priority species (WAH 1998-)

Family		Species	Rehabilitation Year					
			1750	1995	2005	2015	2020	2024
Amaranthaceae		*Ptilotus drummondii*	6					1
		Ptilotus polystachyus					19	229
		Ptilotus sp.						4
Apiaceae		*Daucus glochidiatus*	1					2
		Xanthosia atkinsoniana	2				2	38
		Xanthosia candida	17		2	13		24
		Xanthosia ciliata						3
		Xanthosia huegelii	5		1			10
		Xanthosia singuliflora						7
		Xanthosia sp.						1
Araliaceae		*Trachymene pilosa*	20	8	23	24	9	89
Asparagaceae		*Laxmannia squarrosa*					16	121
		Lomandra caespitosa	26	5	10	1		
		Lomandra drummondii	2					
		Lomandra hermaphrodita	46		3			1
		Lomandra micrantha subsp. *micrantha*	4					
		Lomandra sonderi	3					
		Lomandra spartea	23				1	4
		Lomandra sp.	4	2	2	5	1	19
		Thysanotus dichotomus	2		1			
		Thysanotus fastigiatus						28
		Thysanotus manglesianus	4		18	14	2	
		Thysanotus multiflorus	3				4	32
		Thysanotus thyrsoideus	9		1			
		Thysanotus sp.		2	3			1
Asteraceae	*	*Arctotheca calendula*	2	1		1	1	160
		Asteridea pulverulenta						2
		Brachyscome pusilla	4					
		Craspedia variabilis		1				
	*	*Dittrichia graveolens*						5
		Hyalosperma cotula	5		2	16		39
		Hyalosperma demissum						2
	*	*Hypochaeris glabra*		3	5	14	21	80
	*	*Hypochaeris radicata*		1		1		25
		Lagenophora huegelii	31	3	7	4	1	2
		Millotia tenuifolia var. *tenuifolia*	1		1	1		
		Panaetia lessonii					3	
		Podotheca angustifolia			1	14	7	279
		Podotheca gnaphalioides				3	1	
	*	*Pseudognaphalium luteoalbum*						24
		Pterochaeta paniculata		1	4	5	1	96
		Rhodanthe citrina	4		1	1		12
		Senecio diaschides				3		1
		Senecio hispidulus						1
		Senecio pinnatifolius var. *pinnatifolius*	1					
		Senecio quadridentatus				5	3	15
		Senecio sp.						2

APPENDIX C: FREQUENCY OF 2025 RECORDS OF VASCULAR FLORA IN REHABILITATION YEARS

Note: * denotes introduced species; P1, P3 and P4 denote Priority species (WAH 1998-)

Family		Species	Rehabilitation Year					
			1750	1995	2005	2015	2020	2024
Asteraceae		*Siemssenia capillaris*				1		
(continued)	*	*Sonchus asper*						1
	*	*Sonchus oleraceus*					6	13
		Trichocline spathulata	36	1				
	*	*Ursinia anthemoides*	1	5	2	8	21	149
	*	*Vellereophyton dealbatum*						8
		Waitzia suaveolens						51
		Waitzia suaveolens var. *suaveolens*	1					
		Xerochrysum macranthum				1		83
		Asteraceae sp.						2
Brassicaceae	*	*Brassica tournefortii*					2	8
Campanulaceae		*Isotoma hypocrateriformis*	2				1	7
		Lobelia heterophylla						3
		Wahlenbergia sp.						3
Caryophyllaceae	*	*Petrorhagia dubia*					2	56
Casuarinaceae		*Allocasuarina fraseriana*	13	10	6	2		7
		Allocasuarina huegeliana		13	2	14	3	
		Allocasuarina humilis		12			1	
		Allocasuarina sp.	3	13	3	9	12	74
Celastraceae		*Stackhousia pubescens*	9		4	3	7	10
		Tripterococcus brunonis						11
		Celastraceae sp.						1
Centrolepidaceae		*Centrolepis aristata*						23
		Centrolepis glabra						4
Crassulaceae		*Crassula colorata* var. *acuminata*						2
Cyperaceae		*Cyathochaeta* sp.						1
		Cyperus sp.						2
	*	*Ficinia marginata*						15
		Isolepis cyperoides						2
		Lepidosperma asperatum	11					2
		Lepidosperma costale		1				
		Lepidosperma leptostachyum	18		1	4		3
		Lepidosperma pubisquameum	12					
		Lepidosperma squamatum				1		
		Lepidosperma tenue	13				3	
		Lepidosperma sp.	2		2	1	2	8
		Lomandra purpurea	1					
		Morelotia octandra	32					
		Netrostylis sp. Jarrah Forest (R. Davis 7391	116	6	19	22	11	83
Dilleniaceae		*Hibbertia acerosa*	51	1	2	6	1	8
	P1	*Hibbertia ambita*	14			19	3	
		Hibbertia amplexicaulis	31	1		1	1	3

APPENDIX C: FREQUENCY OF 2025 RECORDS OF VASCULAR FLORA IN REHABILITATION YEARS

Note: * denotes introduced species; P1, P3 and P4 denote Priority species (WAH 1998-)

Family	Species	Rehabilitation Year					
		1750	1995	2005	2015	2020	2024
Dilleniaceae	*Hibbertia commutata*	71	2	16	14	2	19
(continued)	*Hibbertia glomerata* subsp. *glomerata*					6	
	Hibbertia hypericoides	9		2			
	Hibbertia ?inclusa						3
	Hibbertia mylnei		1				
	Hibbertia perfoliata	6			1		
	Hibbertia quadricolor					1	
	Hibbertia semipilosa	1					1
	Hibbertia silvestris	16			3		4
	Hibbertia sp.		6	2	10		101
	Hibbertia sp. 1						12
Droseraceae	*Drosera barbigera*	1					1
	Drosera hyperostigma					3	3
	Drosera platystigma	24		2		1	
	Drosera sp.	3	2	13		3	25
	Drosera sp. Climbing	2					
Elaeocarpaceae	*Tetratheca hirsuta*	8			6		2
	Tetratheca hispidissima	3					
	Tetratheca virgata	15					
Ericaceae	*Andersonia latiflora*	12	6	6	2		
	Andersonia lehmanniana		1	3	1		
	Andersonia sp.						2
	Leucopogon australis	1		1			1
	Leucopogon capitellatus	34			1	2	1
	Leucopogon glabellus	8		1	2		2
	Leucopogon pulchellus	1					
	Styphelia discolor	2		2			
	Styphelia epacridis	12	27	42	28	18	10
	Styphelia nitens	19	8	16	6	6	2
	Styphelia pallida	13					2
	Styphelia propinqua	6		6			6
	Styphelia tenuiflora						1
	Styphelia sp.	1		2			11
Fabaceae	*Acacia alata*		1		4	7	66
	Acacia alata var. *alata*				4	3	
	Acacia applanata						8
	Acacia browniana	5	11			8	21
	Acacia browniana var. *endlicheri*	3	4				
	Acacia celastrifolia	16	71	83	55	45	247
	Acacia dentifera						4
	Acacia drummondii						1
	Acacia drummondii subsp. *candolleana*	24	18	21	35	45	590
	Acacia drummondii subsp. *drummondii*	11	8	11	5	18	436
	Acacia extensa		3		3	10	35
	Acacia gilbertii		1				
	Acacia insolita subsp. *insolita*						1
	Acacia lateriticola	4	5	2		9	228

APPENDIX C: FREQUENCY OF 2025 RECORDS OF VASCULAR FLORA IN REHABILITATION YEARS

Note: * denotes introduced species; P1, P3 and P4 denote Priority species (WAH 1998-)

Family		Species	Rehabilitation Year					
			1750	1995	2005	2015	2020	2024
Fabaceae		*Acacia nervosa*	1				1	29
(continued)		*Acacia preissiana*	27			1	2	23
		Acacia pulchella	12	23	34	90	72	431
		Acacia pulchella var*. glaberrima*	1	2				1
		Acacia saligna			2		4	3
		Acacia urophylla		5		2	1	12
		Acacia willdenowiana	1					13
		Acacia sp.	1		1	1		2
		Bossiaea aquifolium				1		1
		Bossiaea eriocarpa	22	63	53	46	50	361
		Bossiaea ornata	124	25	67	36	16	382
		Bossiaea pulchella			4	8	3	48
		Bossiaea spinescens			2	5	3	14
		Chorizema cordatum				1		1
		Chorizema dicksonii		1				4
		Darwinia citriodora				1		
		Daviesia cordata					11	13
		Daviesia decurrens	1		10	4	12	91
		Daviesia hakeoides subsp. *hakeoides*					1	
		Daviesia incrassata				1	2	2
		Daviesia longifolia	7	4	7	7	23	29
		Daviesia physodes		1	1			24
		Daviesia preissii	11	3	30	19	8	35
		Daviesia rhombifolia	3			6		4
		Daviesia sp.						2
		Gastrolobium bilobum		26	4	46	18	216
		Gastrolobium calycinum		1	2		4	7
		Gastrolobium dilatatum						1
		Gastrolobium spinosum					7	
		Gompholobium confertum						1
		Gompholobium cyaninum		2	1		3	22
		Gompholobium knightianum						22
		Gompholobium marginatum	15	10	4	13	31	134
		Gompholobium polymorphum	2					1
		Gompholobium preissii	12	2	3	7	2	120
		Gompholobium sp.						1
		Kennedia coccinea	1		2	3	7	103
		Kennedia prostrata	10	3	2	12	20	267
		Labichea punctata	18			2	1	4
	*	*Lotus angustissimus*						7
	*	*Lotus uliginosus*						3
	*	*Ornithopus sativus*						5
		Paraserianthes lophantha						5
		Sphaerolobium medium			2			23
		Templetonia drummondii	10					5
		Trifolium arvense						13
	*	*Trifolium campestre*		2			6	4
		Viminaria juncea				1	2	21
		Fabaceae sp.	1					2
Gentianaceae	*	*Centaurium erythraea*						1

APPENDIX C: FREQUENCY OF 2025 RECORDS OF VASCULAR FLORA IN REHABILITATION YEARS

Note: * denotes introduced species; P1, P3 and P4 denote Priority species (WAH 1998-)

Family		Species	Rehabilitation Year					
			1750	1995	2005	2015	2020	2024
Geraniaceae	*	*Erodium botrys*						3
		Erodium cicutarium						2
		Pelargonium littorale						1
Goodeniaceae		*Dampiera alata*	2					1
		Dampiera linearis	3					4
		Dampiera sp.						1
		Goodenia caerulea	3					
		Goodenia trinervis			4		20	68
		Lechenaultia biloba	32		2	1	6	8
		Scaevola calliptera	24			1		16
		Scaevola platyphylla					1	3
		Scaevola sp.				1		1
Haemodoraceae		*Anigozanthos manglesii*						3
		Conostylis pusilla						2
		Conostylis setigera	6		4	2		12
		Conostylis setigera subsp. *setigera*	26			1		
		Conostylis setosa	1					
		Conostylis sp.		1		2		3
Haloragaceae		*Glischrocaryon aureum*	2					
		Glischrocaryon angustifolium	1					
Hemerocallidaceae		*Agrostocrinum hirsutum*						3
		Agrostocrinum scabrum						1
		Chamaescilla corymbosa	1					
		Chamaescilla corymbosa var. *corymbosa*	8					
		Dianella revoluta	1					
		Dianella revoluta var. *divaricata*	2					
		Tricoryne elatior	2				1	
		Tricoryne humilis				1		1
		Tricoryne tenella						3
		Tricoryne sp.	1					
Hypoxidaceae		*Pauridia glabella*	5					
Iridaceae		*Patersonia occidentalis*	20			2		3
		Patersonia pygmaea						1
		Patersonia sp.						1
	*	*Romulea rosea*	1					1
Lamiaceae		*Hemiandra pungens*					1	8
		Hemigenia pritzelii	4					24
		Hemigenia viscida					1	7
Lauraceae		*Cassytha sp.*			2	1		
								1
Lythraceae	*	*Lythrum hyssopifolia*						1

APPENDIX C: FREQUENCY OF 2025 RECORDS OF VASCULAR FLORA IN REHABILITATION YEARS

Note: * denotes introduced species; P1, P3 and P4 denote Priority species (WAH 1998-)

Family		Species	Rehabilitation Year					
			1750	1995	2005	2015	2020	2024
Malvaceae	P4	*Lasiopetalum cardiophyllum*				4		2
		Lasiopetalum floribundum						4
		Lasiopetalum glabratum				1		
Myrtaceae		*Calothamnus quadrifidus*		77	43	16	13	5
		Calothamnus sanguineus		13	20	4	13	63
		Calothamnus sp.		3	3	5	7	241
		Corymbia calophylla	26	5	19		4	34
		Darwinia citriodora				1	1	
		Darwinia sp.						3
		Eucalyptus accedens			7	1	2	7
		Eucalyptus drummondii					3	39
		Eucalyptus marginata	109	75	39	31	22	324
		Eucalyptus patens					10	48
		Eucalyptus wandoo	3		10	3	1	7
		Eucalyptus sp.	2					
		Hypocalymma angustifolium		33	49	49	77	339
		Kunzea glabrescens				1	1	3
		Kunzea recurva	1	37	41	12	36	23
		Kunzea sp.						1
		Leptospermopsis erubescens		1	39	6	21	21
		Melaleuca incana subsp. *incana*					1	
		Melaleuca lateriflora						8
		Melaleuca parviceps		20	8	7	15	
		Melaleuca radula		1	7	2	1	19
		Melaleuca tuberculata				6	5	
		Melaleuca tuberculata var. *tuberculata*		75	10			
		Melaleuca viminalis					1	
		Melaleuca viminalis subsp. *viminalis*		3				
		Melaleuca viminea						2
		Melaleuca sp.		1	3		3	27
		Pericalymma ellipticum	3			1		7
		Verticordia plumosa var. *brachyphylla*				1	1	
		Myrtaceae sp.						8
Orchidaceae		*Caladenia flava* subsp. *sylvestris*		1				
		Caladenia flava	2				1	
		Caladenia sp.	1					
	*	*Disa bracteata*			1		1	
		Diuris longifolia		4				
		Pterostylis sp.		4	2	2		
		Pyrorchis nigricans	2					
		Orchidaceae sp.	1	1				
Orobanchaceae	*	*Bellardia trixago*				1	2	
		Orobanche minor						4
Oxalidaceae		*Oxalis* sp.	4		2			
Phyllanthaceae		*Lysiandra calycina*	41	2	9	7	4	5
		Poranthera microphylla					1	5

APPENDIX C: FREQUENCY OF 2025 RECORDS OF VASCULAR FLORA IN REHABILITATION YEARS

Note: * denotes introduced species; P1, P3 and P4 denote Priority species (WAH 1998-)

Family		Species	Rehabilitation Year					
			1750	1995	2005	2015	2020	2024
Pittosporaceae		*Bellardia trixago*				4		
		Billardiera fusiformis	1	8	7	34	6	18
		Billardiera sp.	1	4	3			6
		Marianthus sp.						2
Poaceae	*	*Aira caryophyllea*	3	14	6	8	5	119
		Amphipogon amphipogonoides	2	1				5
		Austrostipa elegantissima					2	2
		Austrostipa hemipogon			1			
		Austrostipa mollis	1					1
		Austrostipa variabilis					6	129
		Austrostipa semibarbata	5					7
		Austrostipa sp.	1					13
	*	*Avena barbata*		1			7	2
	*	*Avena fatua*					7	1
	*	*Avena* sp.		1				1
	*	*Briza maxima*	1	1				3
	*	*Briza minor*						1
	*	*Bromus hordeaceus*					1	
	*	*Ehrharta longiflora*				4		
	*	*Ehrharta* sp.					2	
	*	*Holcus setiger*						7
	*	*Lolium rigidum*						8
		Neurachne alopecuroidea	23	1	7	6	11	81
	*	*Pentameris airoides*	15			1	1	37
		Poa drummondiana						2
	*	*Polypogon monspeliensis*						2
		Rytidosperma acerosum						4
		Rytidosperma caespitosum	34	7	5	8	10	48
		Rytidosperma setaceum						1
		Rytidosperma sp.			1			
		Tetrarrhena laevis	21	1	2	2		1
	*	*Vulpia fasciculata*						1
	*	*Vulpia myuros*	2	4		2	2	158
	*	*Vulpia myuros* forma *myuros*		1		7		
	*	*Vulpia* sp.					6	5
		Poaceae sp.	3	3	8	1	1	3
Polygalaceae		*Comesperma calymega*	11					
		Comesperma virgatum	2					
Primulaceae	*	*Lysimachia arvensis*		3		1	3	40
Proteaceae		*Banksia bipinnatifida*					1	
		Banksia bipinnatifida subsp. *bipinnatifida*					2	
		Banksia dallanneyi subsp. *dallanneyi* var. *dallanneyi*	66			1		
		Banksia grandis	12	7	16	9	15	177
		Banksia sessilis	71	10	1		1	2
		Banksia sphaerocarpa			1			8
		Banksia sphaerocarpa var. *sphaerocarpa*	2					

APPENDIX C: FREQUENCY OF 2025 RECORDS OF VASCULAR FLORA IN REHABILITATION YEARS

Note: * denotes introduced species; P1, P3 and P4 denote Priority species (WAH 1998-)

Family		Species	Rehabilitation Year					
			1750	1995	2005	2015	2020	2024
Proteaceae		*Banksia squarrosa*	3		16	20	5	181
(continued)		*Banksia squarrosa* subsp. *squarrosa*	6		36	12	12	14
		Grevillea manglesioides						1
		Grevillea monticola					1	15
		Grevillea quercifolia	2					
		Grevillea wilsonii						1
		Hakea amplexicaulis						5
		Hakea cyclocarpa						1
		Hakea incrassata	2					3
		Hakea lissocarpha	30	1			2	15
		Hakea prostrata			7	1	2	3
		Hakea undulata	2	48		3	4	31
		Hovea chorizemifolia	16			2		7
		Hovea trisperma	1					
		Isopogon dubius		4	1			
		Lambertia sp.						1
		Persoonia longifolia	18					3
		Petrophile heterophylla		94	75	36	41	210
		Petrophile serruriae	6	12	1			1
		Petrophile striata	9					
		Synaphea cuneata						1
		Synaphea damopsis	3					
		Synaphea petiolaris	2			2		
Ranunculaceae		*Clematis pubescens*	5					
Restionaceae		*Desmocladus fasciculatus*	18					
		Desmocladus flexuosus	23					1
		Loxocarya cinerea	2					2
Rhamnaceae		*Stenanthemum nanum*						5
		Trymalium ledifolium	16	16	11	33	48	546
		Trymalium odoratissimum			1	16	2	84
		Trymalium odoratissimum subsp. *odoratissimum*				19	4	
		Trymalium sp.						2
Rubiaceae	*	*Galium divaricatum*						19
		Opercularia apiciflora	8					
		Opercularia echinocephala	10			4	3	27
		Opercularia hispidula	1					
		Opercularia vaginata	7					
		Opercularia sp.						1
Rutaceae		*Boronia fastigiata*	3					
		Boronia sp.						11
Santalaceae		*Leptomeria cunninghamii*	3					5
		Santalum acuminatum	6					
Sapindaceae		*Dodonaea ceratocarpa*		1	3			

APPENDIX C: FREQUENCY OF 2025 RECORDS OF VASCULAR FLORA IN REHABILITATION YEARS

Note: * denotes introduced species; P1, P3 and P4 denote Priority species (WAH 1998-)

Family		Species	Rehabilitation Year					
			1750	1995	2005	2015	2020	2024
Stylidiaceae		*Levenhookia preissii*			1			
		Levenhookia pusilla	9		7	9	5	81
		Levenhookia stipitata	1		2		1	5
		Levenhookia sp.	1	1				16
		Stylidium affine		3	2	9	15	56
		Stylidium amoenum	28	1	13	1	5	16
		Stylidium brunonianum	1					
		Stylidium dichotomum			3			
		Stylidium dispermum	1					
		Stylidium hispidum	3		2			
		Stylidium lateriticola	10					7
	P3	*Stylidium marradongense*	10			1		
		Stylidium petiolare				1		
		Stylidium piliferum	42	1	8		3	23
		Stylidium scariosum	2					
		Stylidium schoenoides					2	
		Stylidium uniflorum	1					
		Stylidium sp.			1			
Thymelaeaceae		*Pimelea ciliata*	13					5
		Pimelea sp.				1		2
Xanthorrhoeaceae		*Xanthorrhoea gracilis*	10		1			
		Xanthorrhoea preissii	33					2
		Xanthorrhoea sp.						6
Zamiaceae		*Macrozamia riedlei*	29	1	7		1	26