



Windarling Range Annual Monitoring of *Tetratheca paynterae* subsp. *paynterae*

Prepared for Yilgarn Iron Pty Ltd
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Executive Summary

The Windarling Iron Ore Project is located 135 kilometres (km) north of Southern Cross in the Yilgarn region of Western Australia. Development of the W3 Pit intersected with the small erect decumbent shrub *Tetralochea paynterae* subsp. *paynterae* which is restricted to rock crevices found along the ridge peak of Windarling Range. *Tetralochea paynterae* subsp. *paynterae* is listed as Threatened Flora under the Western Australian *Biodiversity Conservation Act 2016* (BC Act) and as Endangered under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

An annual monitoring program was established in 2003 to assess vegetation condition and plant health and determine if change occurred over time to inform management requirements. A recommendation was made to update the monitoring methodology in 2011 resulting in this becoming the baseline dataset for annual monitoring subsequently conducted through to 2025. The annual monitoring program assesses *Tetralochea paynterae* subsp. *paynterae* plants occurring within seven permanent monitoring plots established at varying distance from the mining operation. Onshore Environmental Consultants Pty Ltd (Onshore Environmental) conducted the most recent annual assessment on the 19th of November and the 12th of December 2025.

The number of alive *Tetralochea paynterae* subsp. *paynterae* plants and mean plant condition for those alive plants both decreased between 2011 and 2018, a period when annual rainfall exceeded the long term average for six of the eight years. Mean plant condition increased between 2019 and 2025 during a period when annual rainfall was below the long term average for five of the seven years. The number of alive plants remained stable between 2019 and 2024 but decreased to a 15 year low in 2025. However, the low number of alive plants recorded in 2025 was likely related to the sampling protocol, with 150 previous records (individuals) unable to be relocated or safely accessed.

A second factor also linked to the methodology that may have impacted data interpretation across the 15 year monitoring period was the replacement of recently dead plants with new alive plants during annual assessments. Labelling of new plants in the field and retention of original plant labels on dead plants also appeared to have caused confusion during annual assessments.

The size of the seven monitoring blocks ranged between 200 m² and 440 m² with a total area of 2,080 m² covered annually. The seven blocks included precipitous sections of cliff line situated in areas of highest relief along Windarling Range. The two Principal Botanists undertaking the field survey have over 55 years combined experience but were unable to assess a number of tagged plants safely. A total of 150 previous locations were unable to be located and/or safely accessed in 2025. It is recommended that the 2026 monitoring program includes a direct reassessment of the 594 alive plants positively identified and assessed in 2025 to accurately determine change over the 12 month period.

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1.0 Preamble

The Yilgarn Iron Ore Project comprises six individual mine sites (Koolyanobbing, Carina, Jackson Ranges, Mt Manning, Windarling and Parker Range) located between 50 km to 150 km from Southern Cross and around 15 km from Marvel Loch in the Yilgarn Region of Western Australia. Cliffs Asia Pacific Iron Ore Pty Ltd (Cliffs) operated the mining operation from 1994 to 2018, with Mineral Resources Limited (MRL) and its wholly owned subsidiary Polaris Metals Pty Ltd (Polaris) purchasing the operations in mid-2018. Yilgarn Iron Investments Pty Ltd (YIIP) recently purchased the Yilgarn Iron Ore Project from MRL with mining re-commencing in October 2025. YIIP currently manages the sites of Koolyanobbing, Carina, Jackson Ranges, Mt Manning, Windarling and Parker Range, plus exploration targets.

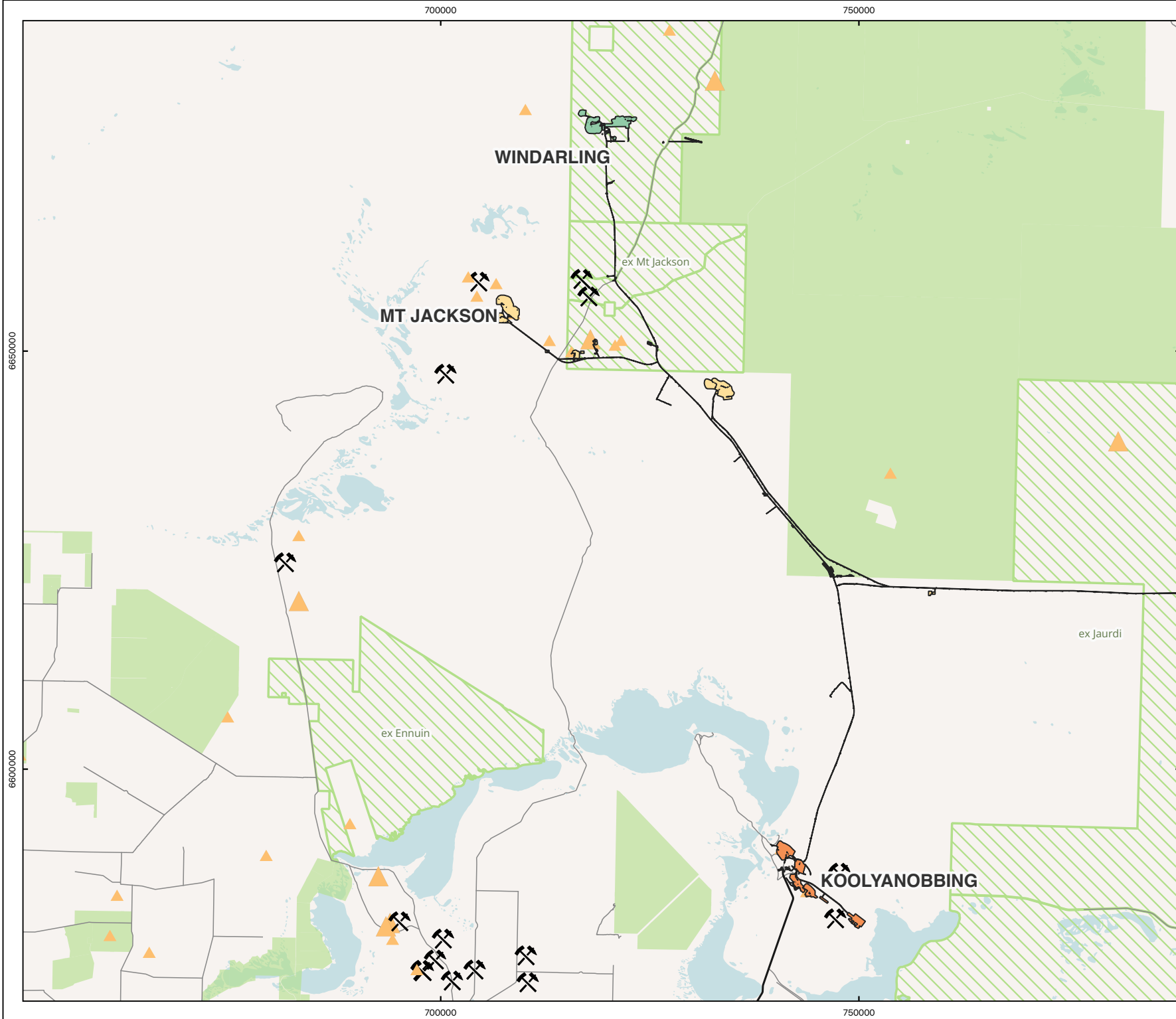
The Windarling Range Project 90 km north northwest of Koolyanobbing and 135 km north of Southern Cross (Figure 1) and has historically involved mining of iron ore near Windarling Peak with processing of ore at Koolyanobbing and then road and rail transport to the Port of Esperance for export. There are currently no active mining operations occurring at the Windarling Iron Ore Project.

In 2025 Onshore Environmental was commissioned by YIIP to undertake annual monitoring of *Tetratheca paynterae* subsp. *paynterae* plant health at Windarling Range in accordance with the requirements of the Yilgarn Operations Flora and Vegetation Management Plan (MRL 2019).

2.0 Objectives and Scope

The annual monitoring program (MRL 2011) was developed to determine if mining operations at the Windarling iron Ore Project were impacting on the health of *Tetratheca paynterae* subsp. *paynterae* plants retained on peaks of Windarling Range occurring adjacent to mining operations. Annual monitoring commenced in 2003 however methodology changed following an independent review in 2011.

The aim of the annual monitoring program was to assess plant condition and reproductive status for tagged *Tetratheca paynterae* subsp. *paynterae* plants within seven permanent monitoring plots established at varying distances from the mining operation.



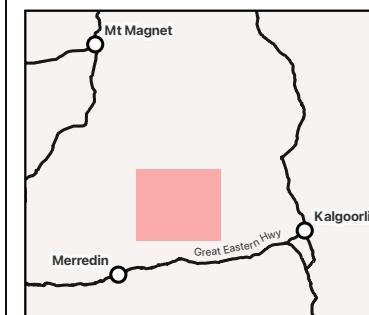
YILGARN IRON WINDARLING

**Figure 1: Location of the
Windarling Project Area**

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Project Areas

- Koolyanobbing
- Mt Jackson
- Windarling
- DBCA Managed Lands
- Former leasehold proposed for conservation



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3.0 Background

3.1 Project Location

The Windarling Iron Ore Project is located approximately 90 km north northwest of Koolyanobbing (Figure 1) within the Southern Cross Interim Biogeographic Regionalisation of Australia (IBRA) subregion.

3.2 Climate

The climate of the Southern Cross subregion is described as arid to semi-arid warm Mediterranean, with 250-300 mm of annual rainfall concentrated during winter months. The nearest Bureau of Meteorology (BoM) weather station with comprehensive data collection and recent historic climate data is Windarling (no. 012141), located approximately 2 km south of the monitored populations of *Tetratheca paynterae* subsp. *paynterae*. Some historical gaps in rainfall data exist for the Windarling weather station, including absence of data after August 2023. For this reason, rainfall data from the next closest weather stations at Koolyanobbing (no. 012227) approximately 100 km south of Windarling, and Southern Cross Airfield (no. 012320) approximately 136 km south of Windarling. The average long term annual rainfall received at Windarling between 2005 and 2023 was 274.3 mm per year (BoM 2026) compared to 302.6 mm for Southern Cross Airfield. A total of 255.3 mm was recorded in the 12 months prior to the 2025 annual monitoring program. Timing and the amount of rainfall is known to effect the population dynamics of *Tetratheca paynterae* subsp. *paynterae* (DPaW 2016). Four of the last five years have recorded below average annual rainfall, two of which are over 40% lower than the long-term average (Figure 2, Appendix 1).

The Southern Cross Airfield weather station is the closest source for temperature data. Mean monthly temperature at Southern Cross Airfield was relatively consistent with the long-term average for the 12 month period prior to the 2025 annual monitoring (Figure 3).

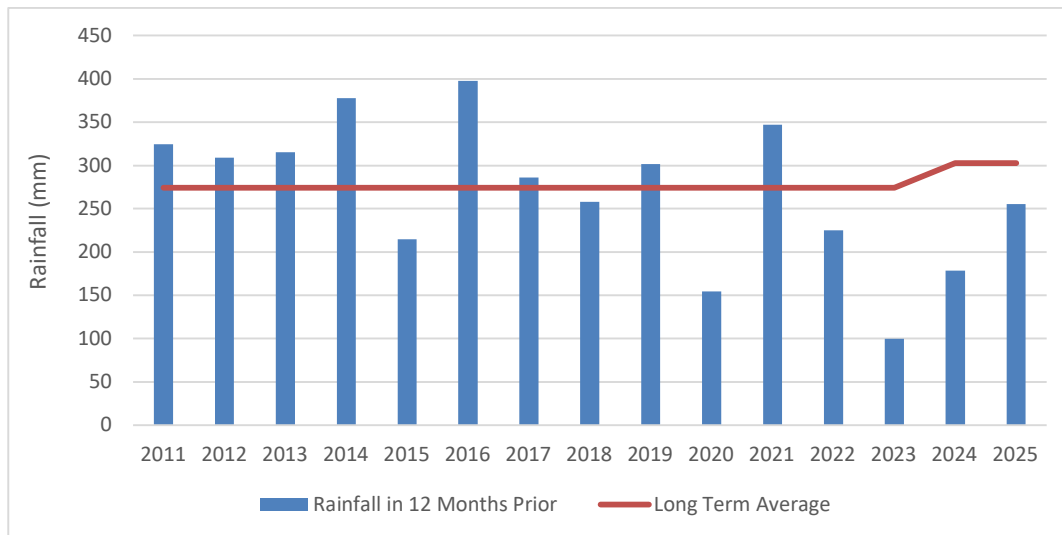


Figure 2 Annual rainfall for the 12 months prior to each annual monitoring event (BoM 2026).

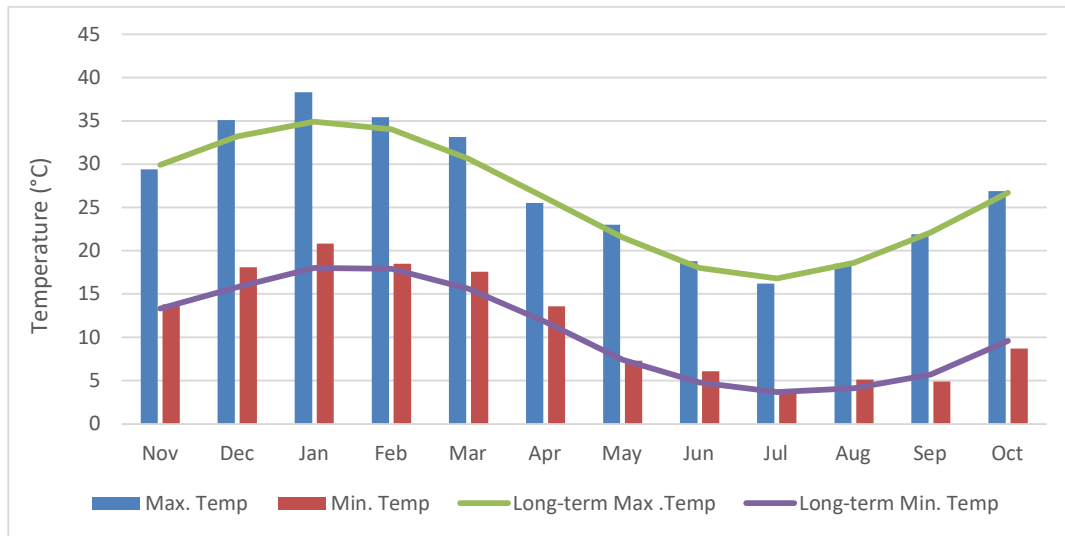


Figure 3 Mean maximum and minimum temperatures in the 12 months prior to the November 2025 assessment, including long-term averages (BoM 2026)

4.0 Methodology

4.1 Monitoring Design

The revised monitoring design recommended by Data Analysis Australia (DAA) in 2011 involved monitoring approximately 1,000 plants within seven defined sampling blocks distributed along the peak of Windarling Range (Figure 4), aimed at capturing dynamics that were representative of the entire population. Sampling included one block from the area most likely to be affected by mining activity (90), one block from the western end of the ridge (4), one block from the southern side of the ridge (85), and four blocks from the remaining main section of the ridge (23, 29, 40 and 45) (Figure 4).

In addition, a number of individuals within each block were randomly selected for condition assessment (percentage of alive foliage) applying the method developed by DAA (2011). DAA (2011) recommended that a subsample of 80-100 individuals should be sufficient to detect meaningful change in plant condition. Based on this recommendation, 139 plants were randomly selected in 2011 for condition assessment. Since then, the condition of the same randomly selected plants has been assessed each year, with any dead individuals replaced annually using the methods developed by DAA (2011).

4.2 Individual Plant Monitoring

All *Tetratheca paynterae* subsp. *paynterae* individuals within the seven blocks were labelled using plastic sheep tags with a unique identification number. For individual plants within each of the seven monitoring blocks the following information has been recorded annually:

- Block number;
- Unique plant identification number;
- Width (cm) (for new individuals only);
- Plant status (reproductive, vegetative, juvenile (1–3 years old), seedling (<1 year old), or dead), and;
- Presence/absence of flowers/fruits/buds.

For the random sub-sample of 139 plants to have condition assessed, the percentage of 'alive plant' was also recorded. Any recent dead plants within the sampling program were replaced with another randomly selected plant utilising the DAA (2011) methodology.

4.3 Timing and Personnel

The 2025 annual monitoring program was conducted on the 19th of November 2025 and the 12th of December 2025 by Principal Botanists Dr Darren Brearley and Dr Jerome Bull and Ecologists Mr Thomas Mott and Mr Bede Chandler from Onshore Environmental.

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YILGARN IRON WINDARLING

**Figure 4: Location of
monitoring plots at
Windarling**

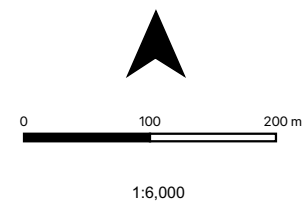
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Dust Monitoring Points

Monitoring Plots

Assessed

Not assessed



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5.0 Results

5.1 Population Assessment

The number of alive *Tetradlea paynterae* subsp. *paynterae* individuals decreased between 2011 (928 plants) and 2018 (789 plants) before remaining relatively stable between 2019 and 2024 (range 755-814 plants) (Table 1). In 2025 there was 594 alive individuals recorded, representing 220 plants less than was recorded in 2024 (Table 1). It is noted that in 2025 there were 150 individuals recorded in 2024 that either could not be relocated or were unable to be safely and accurately assessed, i.e., occurred on vertical ledges that were unable to be safely accessed.

The number of dead *Tetradlea paynterae* subsp. *paynterae* individuals increased from 189 in the 2011 baseline assessment to 436 individuals in 2022, before stabilising in 2023 (423 plants) and 2024 (489 plants) (Table 1). In 2025 there were 373 dead individuals recorded, with the lower number reflecting the 150 individuals that were unable to be relocated or safely accessed in 2025.

The 594 alive plants represents approximately 61% of the 2025 population, a similar proportion to that recorded in 2023 and 2024 (Table 1). Of the 594 alive individuals recorded in 2025, 527 were adult plants, 46 were juvenile and 21 were seedlings (Table 1, Figure 5). There was an increase in the number of juvenile plants recorded in 2025, and the number of seedlings also remained relatively high. There were 446 reproductive individuals recorded in 2025 representing 85% of the total alive adult population. The remaining 15% (81 individuals) were vegetative (Table 1).

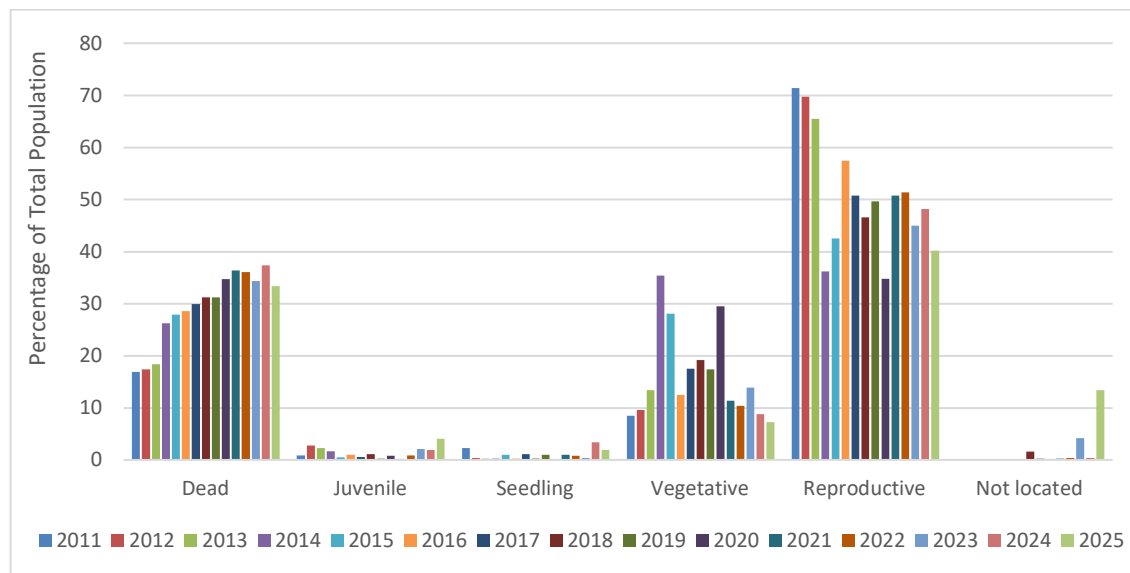


Figure 5 Proportion of the total population at each life stage, 2011 and 2025.

Table 1 Summary of results from annual monitoring between 2011 and 2025.

Parameter	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Dead	189	195	209	301	322	331	350	367	370	411	435	436	423	489	373
Juvenile	10	31	26	19	6	12	7	13	3	9	2	11	26	25	46
Seedling	26	4	3	4	11	3	13	3	12	1	12	10	5	44	21
Vegetative	95	108	152	405	324	145	205	226	206	349	136	125	171	115	81
Reproductive	797	784	742	414	491	666	595	547	588	412	608	620	553	630	446
Not Located	-	1	1	1	1	1	1	19	4	2	3	5	52	5	150 ¹
Total Population	1117	1123	1133	1144	1155	1158	1171	1175	1183	1184	1196	1207	1230	1308	967
Total Alive Population	928	927	923	842	832	826	820	789	809	771	758	766	755	814	594
Percentage of Total Population Alive (%)	83.08	82.55	81.47	73.60	72.03	71.33	70.03	67.15	68.39	65.12	63.38	63.46	61.38	62.23	61.43
Percentage of Total Population Dead (%)	16.9	17.4	18.4	26.3	27.9	28.6	29.9	31.23	31.28	34.71	36.37	36.12	34.39	37.39	38.57
Mortality rate (%)	-	0.54	1.6	10.4	6.5	2.4	2.3	4.5	3.8	5.7	4.3	2.4	3.3	7.5	0
Change in Mortality	-	-	1.06	8.8	-3.9	-4.1	-0.1	2.2	-0.7	1.9	-1.4	-1.9	0.9	4.2	-7.5
Percentage of Alive adult Population Reproductive	89.3	87.9	83.0	50.5	60.2	82.1	74.4	70.8	74.1	54.1	81.7	83.2	76.4	84.6	84.6
Percentage of Alive adult Population Vegetative	10.7	12.1	20.5	49.5	39.8	17.9	25.6	29.2	25.9	45.9	18.3	16.8	23.6	15.4	15.4
Recruitment rate (%)	-	0.43	0.32	0.43	1.31	0.36	1.57	0.37	1.52	0.12	1.56	1.32	0.65	5.83	3.54

¹ For individuals that could not physically be reached safely, parameters were either assessed from a distance or recorded as inaccessible and included as 'Not Located'.

5.1.1 Total Alive Population

The total number of alive individuals decreased by 220 plants between 2024 and 2025 (Figure 6). It is noted that there were 150 individuals that could not be relocated or safely and accurately assessed in 2025 (compared to five plants in 2024); nevertheless, the number of alive plants was lower in 2025 compared to 2024. Since monitoring began in 2011 there has been a decreasing trend in the total number of alive plants recorded (Figure 6). The 2025 assessment recorded the lowest number of alive individuals (594) across the 15 years of annual monitoring (Figure 6).

The total number of dead plants recorded has shown a corresponding increasing trend between 2011 and 2024 (Figure 7). In 2025 the total number of dead individuals decreased by 116 compared to the 2024 assessment and represented the lowest number (373) recorded since 2019 (Figure 7). However, the decrease in number of plant deaths recorded in 2025 may be related to the high number of individuals that could not be relocated, i.e., these plants may have died.

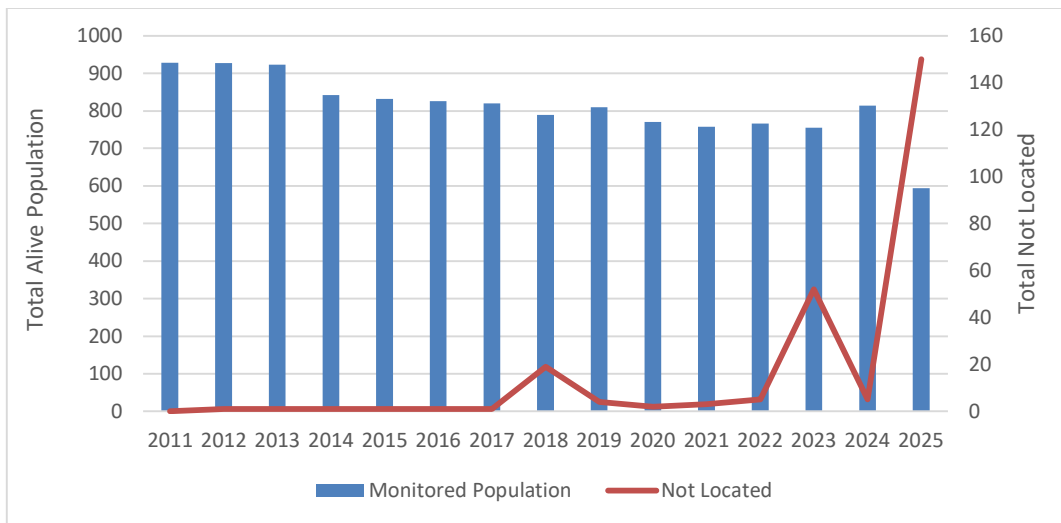


Figure 6 Total alive plants and total number of plants not located between 2011 and 2025.

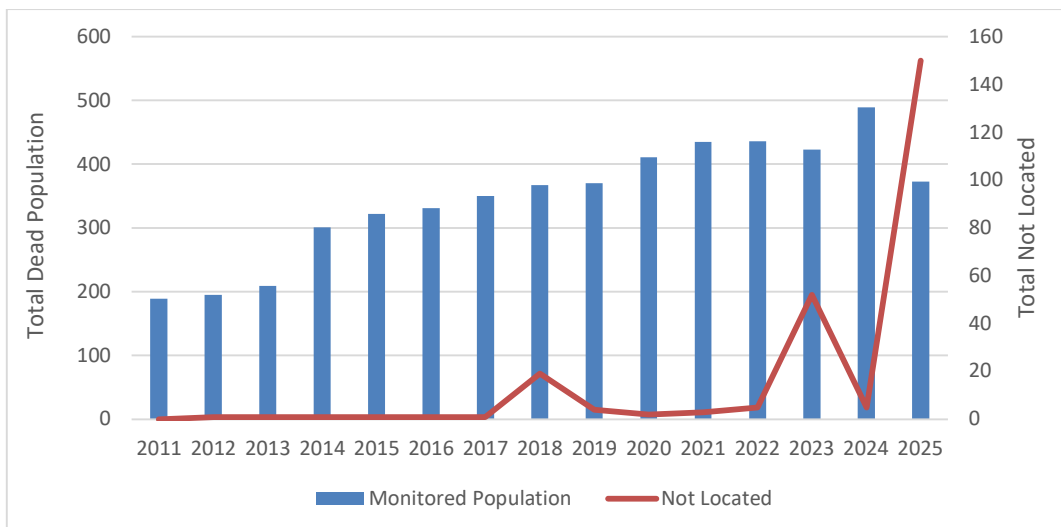


Figure 7 Total dead plants and total number of plants not located between 2011 and 2025.

5.1.2 Reproductive Status

The percentage of reproductive plants within the adult population was high in 2024 and 2025 (85%) and only marginally lower than the 2011 baseline assessment (89%). Other years recording reproductive percentages >80% included 2012, 2013, 2016, 2021 and 2022 (Figure 8). The lowest proportion of reproductive plants was recorded in 2014 (50%), 2015 (60%) and 2020 (54%) (Figure 8). Low annual rainfall corresponded with a lower proportion of reproductive plants in 2015 and 2020, but there was no corresponding relationship evident in 2014 or 2023 (Figure 8).

A high percentage of the reproductive population was recorded with buds in 2011 (85%) compared to 2024 and 2025 (<15%). However, there was a higher percentage of reproductive plants recorded with flowers and fruits in 2025 compared to the 2011 baseline assessment (Figure 9).

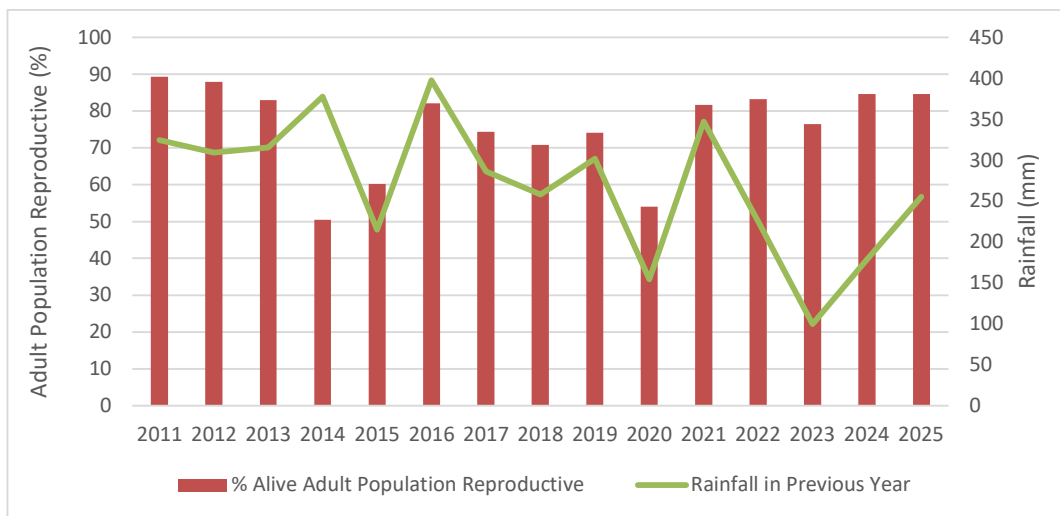


Figure 8 Percentage of the adult population reproductive and the rainfall in the 12 months prior to monitoring between 2011 and 2025.

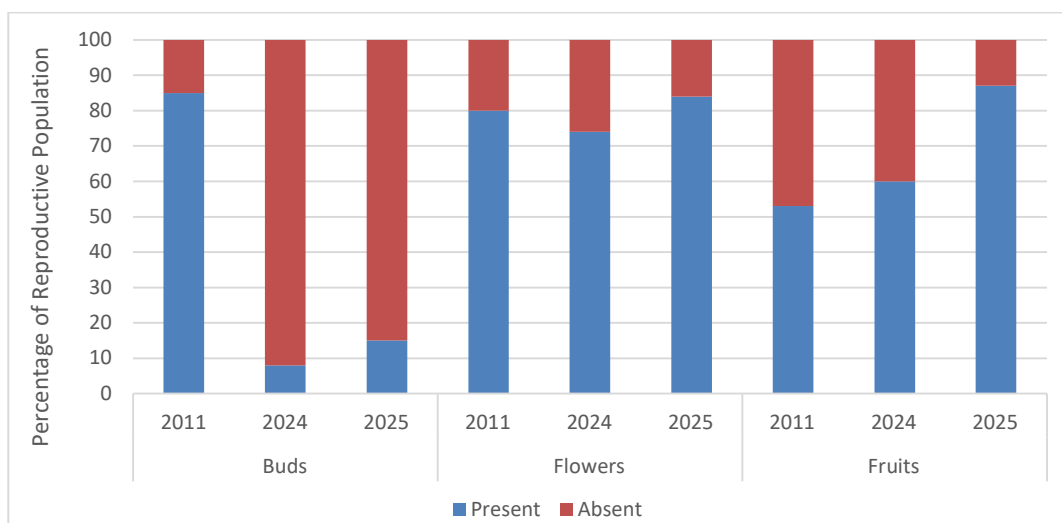


Figure 9 Percentage of the reproductive population with buds, flowers and fruits in 2011, 2024 and 2025.

5.1.3 Recruitment and Mortality

A total of 21 seedlings were recorded in 2025, representing a recruitment rate of 3.5% (Figure 10). This represented a decrease from 2024 but was higher in comparison to the 2012 to 2023 annual assessments and consistent with the 2011 baseline assessment (Table 1).

The 2025 recruitment rate recorded in blocks 4, 23, 29, 40 and 45 was lower than in 2024 but higher than the baseline. Recruitment was recorded for the first time in block 85 (100 m from the pit) while there was no recruitment within block 90 (closest to pit) across all three annual assessments (Figure 11).

The mortality rate between the 2024 and 2025 annual monitoring programs decreased from 7.5% to 0%, with the total number of dead individuals decreasing by 116 over the 12 month period (Figure 12). The highest mortality rate of 10.4% was recorded in 2014.

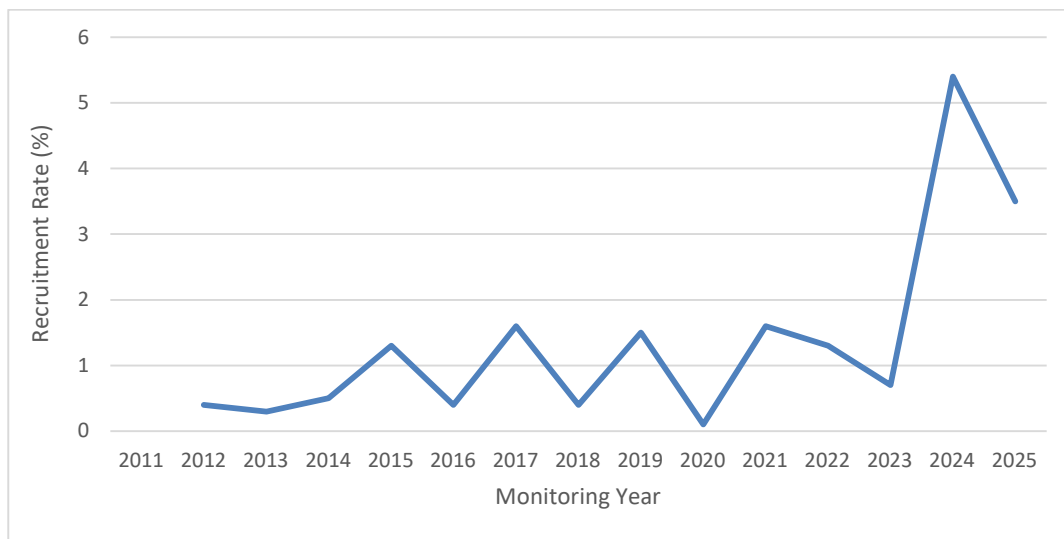


Figure 10 Recruitment rate recorded between 2011 and 2025.

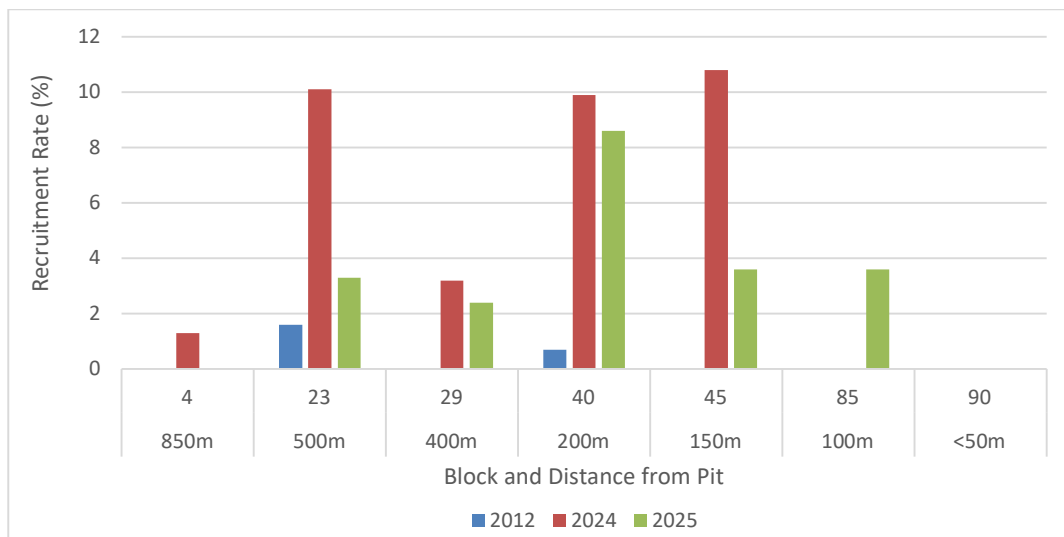


Figure 11 Recruitment rate recorded for individual plots in 2012, 2024 and 2025.

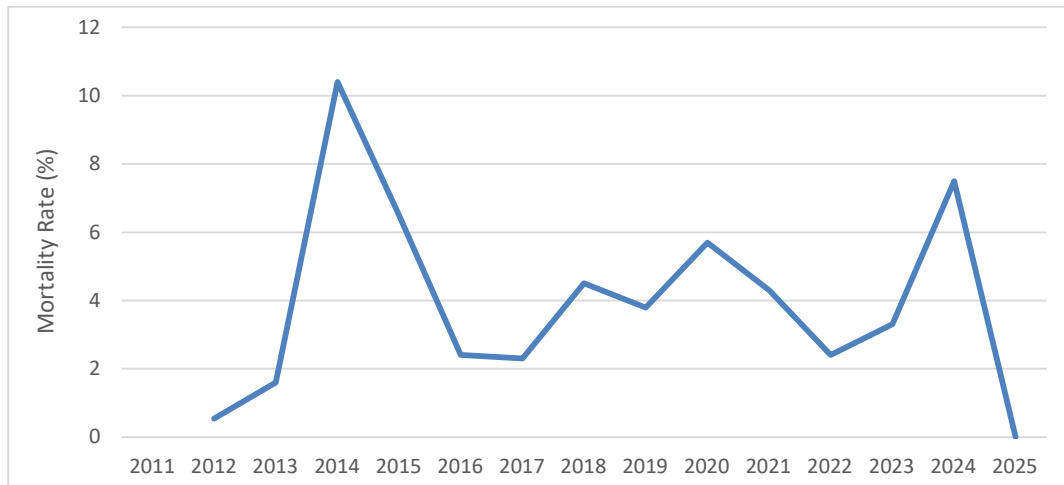


Figure 12 Mortality rate recorded between 2011 and 2025.

5.2 Condition Assessment

There was a general decline in plant condition between 2011 and 2018 with a noticeable 'trough' recorded in 2018 for six of the seven monitoring sites (Figure 13). Plant condition showed an increasing trend within most blocks from 2019 to 2025. The highest mean plant condition was recorded at four of the seven blocks in 2025, with the remaining three blocks recording mean values close to the maximum across the 15 year monitoring period (Figure 13).

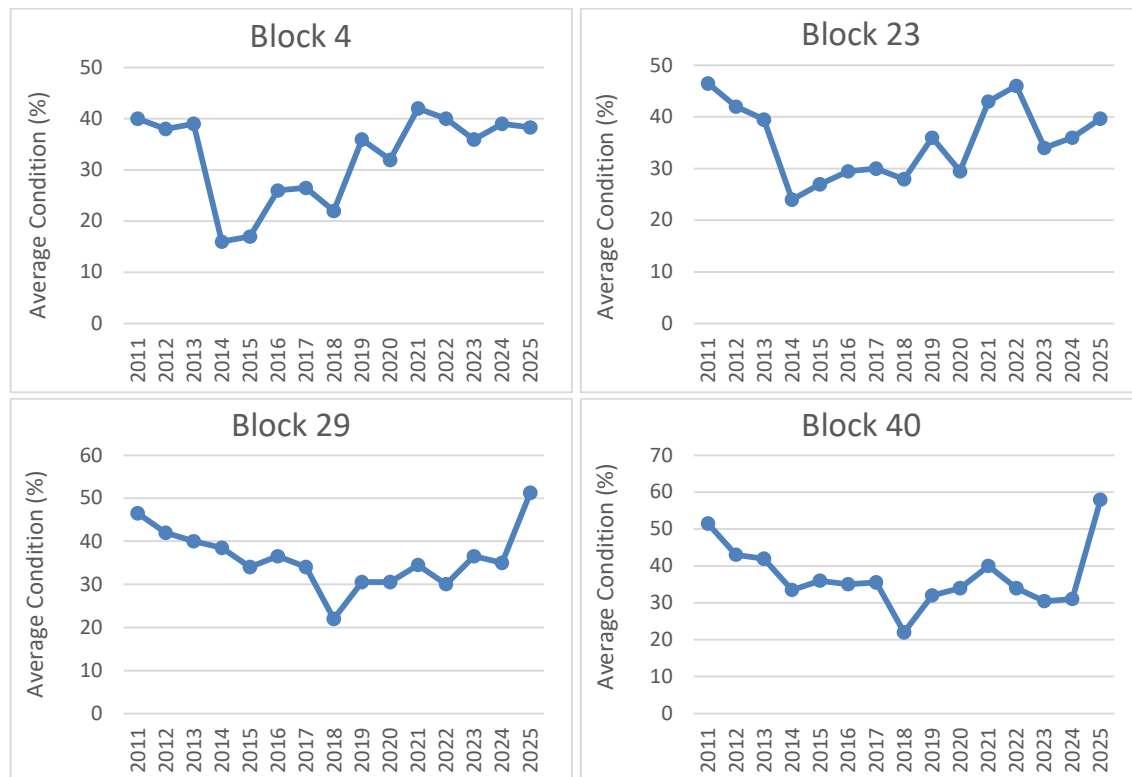


Figure 13 Average plant condition across the seven blocks between 2011 and 2025.

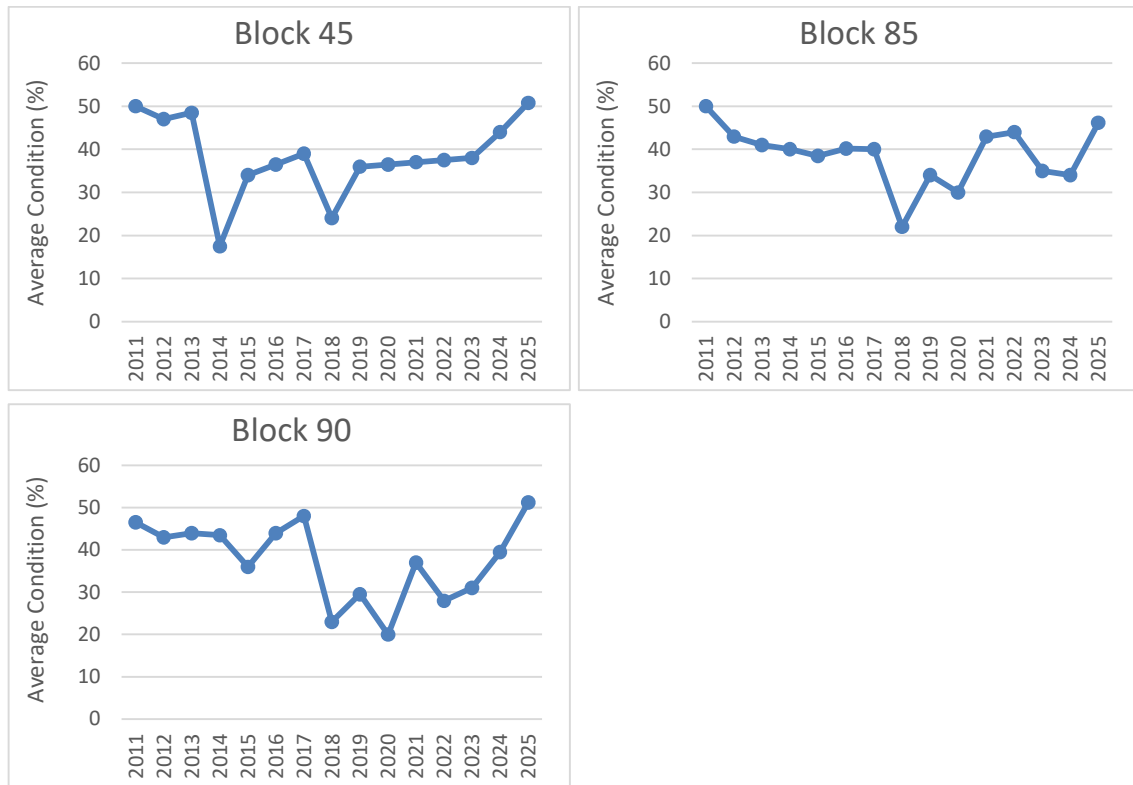


Figure 13 cont'd Average plant condition across the seven blocks between 2011 and 2025.

5.3 Dust Deposition

Monthly monitoring of dust deposition is undertaken by YIPL using standard dust deposition gauges located at flora monitoring plots surrounding the Windarling Iron Ore Project. Data was recorded from three near pit monitoring sites, three far pit monitoring sites, three transition sites, five control sites, one replicate site, and six sites at Penny's Wall between January and October 2025. The trigger criteria set for dust deposition is 40 g/m²/month (MRL 2019).

Dust deposition in 2025 was <0.4 g/m²/month at the far pit monitoring sites, <0.97 g/m²/month at near pit monitoring sites, <0.68 g/m²/month at transition sites, <0.67 g/m²/month at control sites, <1.3 g/m²/month at the Penny's Wall sites, and <0.68 g/m²/month at the replicate site (Table 2 and Figure 14). The trigger criteria level of 40 g/m²/month was not exceeded in 2025.

Table 2 Summary of dust deposition data at Windarling between January and October 2025
units = Sa - ash g/m²/month (location of dust gauges shown in Figure 4).

Plot	Location	Jan-2025	Feb-2025	Mar-2025	Apr-2025	May-2025	Jun-2025	Jul-2025	Aug-2025	Sep-2025	Oct-2025	Trigger Level
A	Near Pit	0.91	0.65	0.93	0.46	0.23	0.28	0.39	0.48	0.58	0.97	40
B	Near Pit	0.42	0.44	0.20	0.30	0.10	0.26	0.20	0.21	0.66	0.48	40
C	Near Pit	0.30	0.33	0.31	0.37	0.11	0.41	0.13	0.18	0.23	0.58	40
D	Transition	0.68	0.34	0.53	0.31	0.10	0.28	0.10	0.12	0.31	0.49	40
E	Transition	0.39	0.23	0.36	0.16	0.15	0.20	0.12	0.20	0.33	0.36	40
G	Transition	0.39	0.31	0.65	0.32	0.23	0.31	0.16	0.25	0.27	0.32	40
H	Far Pit	0.22	0.19	0.28	0.25	0.10	0.10	0.10	0.20	0.21	0.32	40
I	Far Pit	0.40	-	0.40	0.28	0.11	0.25	0.19	0.15	0.26	0.22	40
J	Far Pit	0.16	0.28	0.33	0.21	0.10	0.14	0.10	0.11	0.31	0.40	40
P1A	Penny's Wall	-	0.68	0.70	1.30	0.44	0.73	0.19	0.57	0.49	1.20	40
P1B	Penny's Wall	0.95	0.78	0.54	1.10	0.35	0.49	0.20	0.47	0.39	1.30	40
P2A	Penny's Wall	0.53	0.46	0.46	0.78	0.15	0.35	0.17	0.39	0.38	0.96	40
P2B	Penny's Wall	0.52	0.53	0.55	0.87	0.18	0.52	0.22	0.51	0.38	1.10	40
P2S	Penny's Wall	-	-	-	-	-	-	-	-	-	-	40
P3A	Penny's Wall	0.46	0.42	0.53	0.72	0.15	0.46	0.18	0.59	0.44	0.97	40
P3B	Penny's Wall	0.70	0.44	0.62	0.68	0.25	0.46	0.16	0.32	0.36	0.74	40
K	Control	0.19	0.21	0.33	0.23	0.11	0.12	0.10	0.15	0.21	0.24	40
Y	Control	0.00	0.37	0.56	0.26	0.10	0.15	0.10	0.17	0.23	0.35	40
Z	Control	0.49	0.36	0.46	0.20	0.10	0.15	0.19	0.19	0.26	0.50	40
W	Control	0.53	0.67	0.48	0.30	0.10	0.18	0.10	0.20	0.31	0.63	40
X	Control	0.38	0.32	0.30	0.54	0.13	0.39	0.16	0.17	0.39	0.49	40
L	Replicate	-	-	-	-	-	-	-	-	0.68	0.45	40
M	Blank	-	-	-	-	-	-	-	-	-	-	40

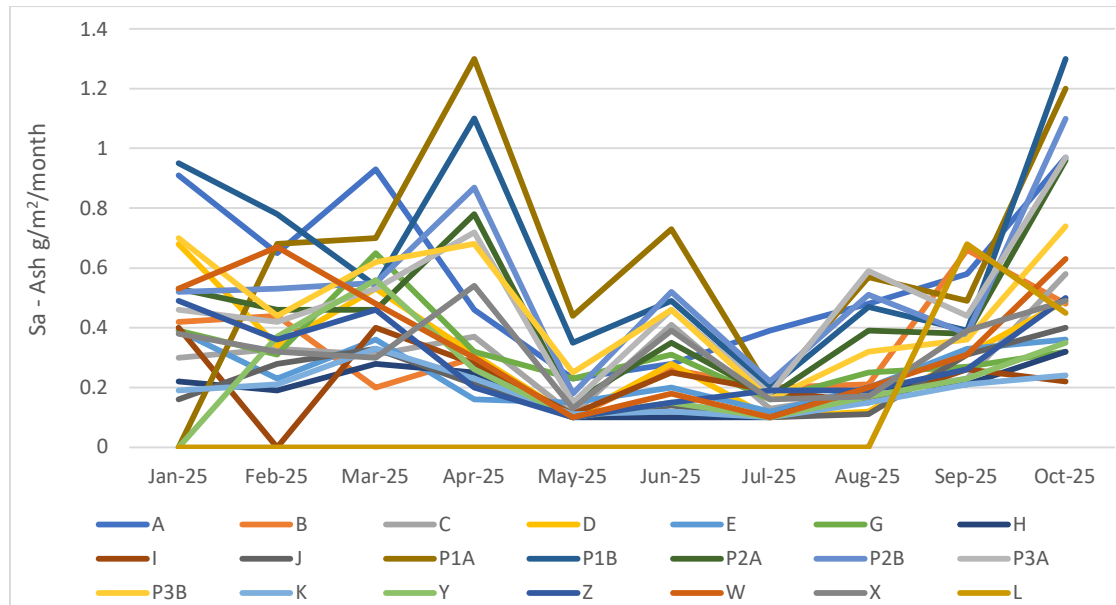


Figure 14 Dust levels recorded at each DDG between October 2024 and October 2025.

6.0 Summary and Conclusions

6.1 Population Assessment

The number of alive *Tetradlea paynterae* subsp. *paynterae* plants showed a continual decline between 2011 and 2018 (from 928 to 789 plants) and remained relatively stable between 2019 and 2024 (755-814 plants). In 2025 there was 594 alive plants recorded, noting there were 150 previous records that could not be relocated or were unable to be safely and accurately assessed.

The number of dead *Tetradlea paynterae* subsp. *paynterae* plants increased between 2011 and 2022 (from 189 to 436 plants) and remained relatively stable in 2023 (423 plants) and 2024 (489 plants). In 2025 there were 373 dead plants recorded, with the lower number influenced by the 150 individuals that were unable to be relocated or safely accessed in 2025.

Of the 594 alive plants recorded in 2025, 527 were adult (446 reproductive and 81 vegetative), 46 were juvenile and 21 were seedlings.

The percentage of reproductive plants within the adult population was high in 2024 and 2025 (85%) and only marginally lower than the 2011 baseline assessment (89%). The lowest proportion of reproductive plants was recorded in 2014 (50%), 2015 (60%) and 2020 (54%). Low annual rainfall corresponded with a lower proportion of reproductive plants in 2015 and 2020, but there was no corresponding relationship evident in 2014 or 2023.

A high percentage of the reproductive population was recorded with buds in 2011 (85%) compared to 2024 and 2025 (<15%). However, there was a higher percentage of reproductive plants recorded with flowers and fruits in 2025 compared to the 2011 baseline assessment.

6.2 Plant Condition Assessment

Plant condition showed a general declining trend between 2011 and 2018 and a corresponding increasing trend between 2019 to 2025. Above average annual rainfall was received for six of eight years between 2011 and 2018 and two of seven years between 2019 and 2025.

The highest mean plant condition was recorded at four of the seven monitoring blocks in 2025, with the remaining three blocks recording mean plant condition close to the maximum value recorded across the 15 year monitoring period. Dust deposition monitoring confirmed that dust levels remained well below both trigger and threshold targets throughout 2025 and were not impacting plant condition at the Windarling Iron Ore Project.

6.3 Conclusion and Recommendations

The number of alive *Tetradlea paynterae* subsp. *paynterae* plants and mean plant condition for those alive plants both decreased between 2011 and 2018, a period when annual rainfall exceeded the long term average for six of the eight years. Mean plant condition increased between 2019 and 2025 during a period when annual rainfall was below the long term average for five of the seven years. The number of alive plants remained stable between

2019 and 2024 but decreased to a 15 year low in 2025. However, the low number of alive plants recorded in 2025 was likely related to the sampling protocol, with 150 previous records (individuals) unable to be relocated or safely accessed.

A second factor also linked to the methodology that may have impacted data interpretation across the 15 year monitoring period was the replacement of recently dead plants with new alive plants during annual assessments. Labelling of new plants in the field and retention of original plant labels on dead plants also appeared to have caused confusion during annual assessments.

The size of the seven monitoring blocks ranged between 200 m² and 440 m² with a total area of 2,080 m² covered annually. The seven blocks included precipitous sections of cliff line situated in areas of highest relief along Windarling Range. The two Principal Botanists undertaking the field survey have over 55 years combined experience but were unable to assess a number of tagged plants safely. A total of 150 previous locations were unable to be located and/or safely accessed in 2025. It is recommended that the 2026 monitoring program includes a direct reassessment of the 594 alive plants positively identified and assessed in 2025 to accurately determine change over the 12 month period.

7.0 References

- Bureau of Meteorology (2026). *Bureau of Meteorology Climate Data Online*. Commonwealth of Australia, Bureau of Meteorology (BoM). <<http://www.bom.gov.au/climate/data/>>
- Data Analysis Australia (2011). *Ricinocarpos brevis Condition Assessment Plant Selection* (Report prepared for Cliffs Natural Resources Pty Ltd., July 2011). Data Analysis Australia.
- Department of Parks and Wildlife (2016). *Tetratheca paynterae* subsp. *Paynterae Interim Recovery Plan 2016-2021* (Interim Recovery Plan No. 365). Department of Parks and Wildlife (DPaW).
- Mineral Resources Limited (2019). *Yilgarn Operations Flora and Vegetation management Plan (242-EN-PLN-0002)*.
- Yates, C., Pettit, N., Gibson, N., Dillon, R., and Palmer, R. (n.d.). *The Population Ecology of Tetratheca (Eleaocarpaceae) on the Banded Iron Formation Ranges of the Yilgarn*. Department of Environment and Conservation.

APPENDIX 1

Historical Rainfall Data from the Windarling Range Iron Ore Project

Annual Assessment	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual rainfall
2011 Monitoring (2010–2011)	0	3.0	15.6	73.2	101.7	3.2	10.0	15.6	15.0	47.1	25.2	15.0	324.6
2012 Monitoring (2011–2012)	71.6	16.8	61.0	34.0	5.0	54.7	1.4	8.8	24.5	15.6	2.6	13.0	309.0
2013 Monitoring (2012–2013)	18.8	28.6	22.2	43.6	0.4	54.8	21.2	45.8	15.4	25.2	12.6	26.8	315.4
2014 Monitoring (2013–2014)	8.4	25.4	3.6	162.4	2.5	10.2	60.2	44.0	8.8	14.8	12.2	25.2	377.7
2015 Monitoring (2014–2015)	28.2	9.2	7.2	0.6	1.2	38.3	25.7	7.6	17.4	19.0	58.9	1.6	214.9
2016 Monitoring (2015–2016)	13.0	52.6	18.4	63.6	40.4	43.6	24.1	29.4	39.0	36.6	29.4	7.6	397.7
2017 Monitoring (2016–2017)	10.0	0.5	16.6	53.4	112.0	11.4	2.2	6.9	6.0	17.9	33.6	15.7	286.2
2018 Monitoring (2017–2018)	1.0	20.2	8.4	59.0	51.2	9.5	0.3	3.2	24.8	32.6	46.8	1.0	258.0
2019 Monitoring (2018–2019)	27.9	35.6	14.6	0.2	8.9	59.4	63.0	3.4	60.8	15.1	10.7	2.0	301.6
2020 Monitoring (2019–2020)	4.1	0	13.2	22.4	38.9	13.1	0.2	9.3	12.5	13.2	27.6	0	154.5
2021 Monitoring (2020–2021)	0	28.8	1.4	2.3	27.8	88.2	6.5	63.2	8.2	105.1	12.1	3.6	347.2
2022 Monitoring (2021–2022)	15.0	27.6	0	3.2	23.0	22.7	1.0	15.5	24.1	19.6	48.6	25.0	225.3
2023 Monitoring (2022–2023)	6.0	0	0	0.9	19.2	6.2	0	0.7	37.2	4.5	14.0	11.0	99.7
2024 Monitoring (2023–2024)	0	18.5	0	0	12.6	1.4	7.8	1.5	67.8	25.9	32.2	11.0	178.7
2025 Monitoring (2024–2025)	4.2	50.2	24.0	11.0	9.6	35.8	0.6	0.4	6.9	19.4	78.8	14.4	255.3
Southern Cross Long Term Average (1996–2025)	17.2	19.2	14.0	26.9	25.6	34.5	24.6	26.3	27.9	34.5	34.6	19.6	298.3