Western Botanical

Microcorys elatoides Pilot Demographic Study

Prepared for: Covalent Lithium Pty Ltd

Report Ref: WB1055

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1. Executive Summary

Covalent Lithium Pty Ltd (Covalent) is undertaking biological surveys in support of an application for Mining Proposal for the Life of Mine (LOM) of the Earl Grey Lithium Project (EGLP), located near Mount Holland, around 500 km east of Perth and 105 km south of Southern Cross.

One of the significant flora species within the EGLP development envelope is *Microcorys elatoides* Priority 1, known from the mine Development Envelopes, Unallocated Crown Land (UCL) in the Mt Holland area, and from the Jilbadji Nature Reserve. Under clause 2-1(3) of Ministerial Statement 1199, no more than 9,732 individuals of *Microcorys elatoides* are to be subject to direct disturbance in development of the EGLP.

The overall recorded population of *Microcorys elatoides* to March 2025 stands at 364,547 plants. Eight of these have already been taken within the MS1199 (Marvel Loch – Forrestania Road alignment) footprint and 3,070 have already been taken within the CPS10049 (Marvel Loch – Forrestania Road alignment) footprint. This leaves a total extant population of 361,469 plants as at March 2025.

Calculation of Impacts using Plant Counts

In the planned development of the EGLP, raw counts of plants to be taken include: 7,962 within MP121883 (approved number to be taken within the mine footprint) and 33,354 within the Life of Mine (LOM) footprint. These represent 2.18% and 9.15% of the overall known population of *Microcorys elatoides* respectively (total 41,316 plants, 11.33%).

Numbers of plants counted in EIA Assessments 2018-2024	Total Known	Within MP121883	Within LOM	Total
Number	364,547	7,962	33,354	41,316
(Percentage)	(100%)	(2.18%)	(9.15%)	(11.33%)

If the calculated number of seedlings (3,009 seedlings) and young single-stemmed plants (3,803 plants) calculated using the regression analysis in this demographic study is utilised to deduct immature plants from the overall raw data counts, then the numbers of mature multi-stemmed plants to be taken is reduced to 34,406, representing 9.44% of the overall population.

Calculated number of mature plants	**Within MP121883 and LOM**			
Seedlings and young plants deducted using regression analysis		**Seedlings**	**Single stemmed young plants**	**Mature multi-stemmed plants**
Numbers Deducted **(Percentage)**		3,009 (0.83%)	3,803 (1.04%)	**Amended Total** 34,406 (9.44%)

Extent of Occurrence and Calculation of Impacts using Area of Occupancy

The Extent of Occurrence (EOO)) of *Microcorys elatoides*, inclusive of all known populations of the species, is calculated as 109,543 ha extending from south and east of the EGLP minesite, northwards to the Jilbadji Nature Reserve and westwards to a population on King Ingram Road. Within the EOO polygon, the Area of Occupancy (AOO), is calculated as 331.17 ha, representing 0.30% of the EOO.

Area of Occupancy (AOO) is calculated as a 5m radius around any given data point recorded in surveys for *Microcorys elatoides*. Of the 331.17 ha AOO occupied by *Microcorys elatoides* known as at March 2025, 13.60 ha lies within the proposed MP121883 mine footprint and 30.50 ha lies within the proposed LOM footprint. These represent 4.11% and 9.07% respectively of the overall known AOO to date (total 43.80 ha, 13.18%). Outside the proposed mine footprint areas, 43.62 ha remains within the Jilbadji Nature Reserve and 243.90 ha remains outside, within Unallocated Crown Land (UCL).

Area of Occupancy (AOO)	**Total AOO**	**Within MP121883**	**Within LOM**	**Total**
AOO **(Percentage)**	331.17 ha (100%)	13.60 ha (4.11%)	30.50 ha (9.07%)	43.80 ha (13.18%)

2. Introduction

2.1. Project Background

Covalent Lithium Pty Ltd (Covalent) is developing the Earl Grey Lithium Project (EGLP) near Mount Holland, located around 500 km east of Perth and 105 km south of Southern Cross (Figure 1). The EGLP has been approved for development under Ministerial Statement 1199. The project includes the existing mine footprint in Mining Proposal 121883 and an area to the north and west referred to as the Life of Mine (LOM) Development Envelope.

Under clause 2-1(3) of Ministerial Statement 1199, no more than 9,732 individuals of *Microcorys elatoides* (Priority 1) are to be subject to direct disturbance inside the development envelope of the Mount Holland Project. Through the implementation of the EGLP's MP 121883 and LOM proposals, 41,218 plants of *Microcorys elatoides* are proposed to be impacted as follows:

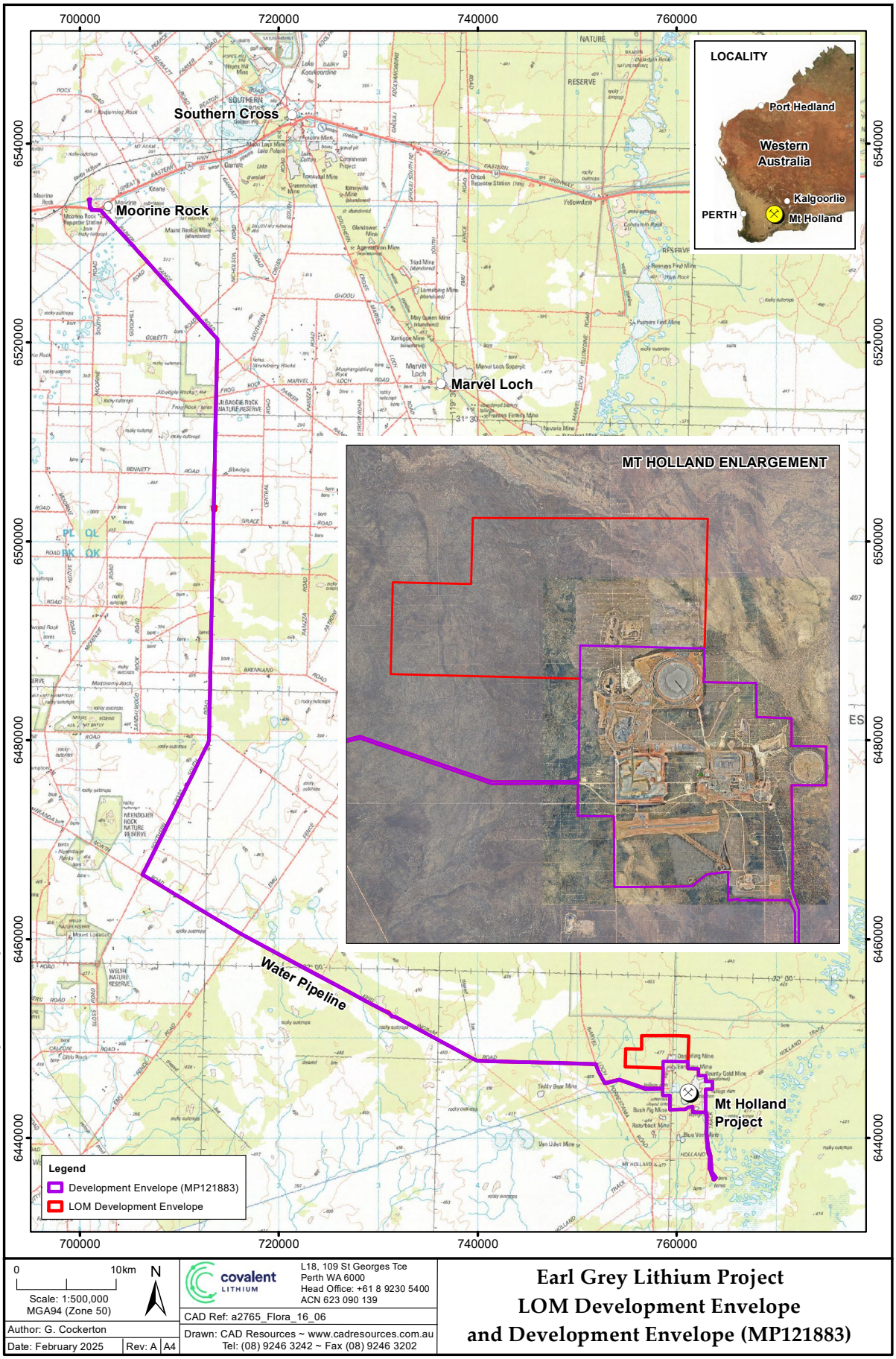
Mining Proposal 121883 Development Footprint..... 7,962 plants

Life of Mine Development Footprint ..... 33,256 plants

Historical records and recently conducted botanical surveys for the Mount Holland Project have recorded 364,547 *Microcorys elatoides* plants including: 265,637 plants outside the Mt Holland mine Development Envelope and Life of Mine Footprint, 57,692 plants within various disturbance envelopes near Mt Holland (plants known in total). The EGLP as planned will impact 11.31% of the total known population of *Microcorys elatoides* plants.

Covalent engaged Western Botanical to undertake quadrat sampling of *Microcorys elatoides* within and surrounding the Development Envelope and Life of Mine Footprint as part of a pilot demography study that investigates the relationship between plant size and age, population counts and time since fire event. Data gathered here and in a desktop review of *Microcorys elatoides* is presented with a regression analysis demonstrating the numbers of seedlings and immature plants within populations of *Microcorys elatoides* of differing ages since last fire. This data, with Area of Occupancy and Extent of Occupancy are used to offer alternate views of the potential impacts to *Microcorys elatoides* in development of the EGLP.

Figure 1. Location of the Mount Holland Project


700000
720000
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LOCALITY
Port Hedland
Western Australia
Kalgoorlie
PERTH
Mt Holland
Southern Cross
Moorine Rock
Marvel Loch
MT HOLLAND ENLARGEMENT
Water Pipeline
Mt Holland Project
Legend
Development Envelope (MP121883)
LOM Development Envelope
0
10km
Scale: 1:500,000
MGA94 (Zone 50)
N
covalent LITHIUM
L18, 109 St Georges Tce
Perth WA 6000
Head Office: +61 8 9230 5400
ACN 623 090 139
CAD Ref: a2765_Flora_16_06
Author: G. Cockerton
Drawn: CAD Resources ~ www.cadresources.com.au
Date: February 2025
Rev: A
A4
Tel: (08) 9246 3242 ~ Fax (08) 9246 3202
Earl Grey Lithium Project
LOM Development Envelope
and Development Envelope (MP121883)
Drawn: CAD Resources ~ www.cadresources.com.au ~ Base Images: Covalent, Landgate

2.2. *Microcorys elatoides* (P1) Taxonomy and Publicly Available Information

Microcorys elatoides (P1) (Lamiaceae), commonly known as Mount Holland *Microcorys*, is an erect, compact shrub to 1.5 m tall that is multi-stemmed at ground level from fire-resistant rootstock (T.C. Wilson & M. Hislop, 2020) (Plate 1). The leaves are inserted in whorls of three and are obscurely petiolate. The linear to very narrowly obovate lamina are 5 to 22 mm long, 1.0 to 1.4 mm wide, terete or subterete in cross section, and dark green becoming yellowish towards the tip. The corolla is 9 to 12 mm long, and pale mauve or white with a very pale wash of mauve in colour. The calyx is five-lobed, with lobes that are up to half the length of the calyx tube. *Microcorys elatoides* has an extended flowering period during the winter-spring months (August to October), most likely in response to locally intermittent rainfall across that period.

Microcorys elatoides, found on shallow sands over low rolling laterite gravel hills, can be confused with the common and widespread *Eremophila ionantha*, found on heavy sandy clay soils in valley floors, when observed in the vegetative state. However, the two are readily distinguished when in flower. The two species do not grow together, having these significantly contrasting habitat requirements.

Microcorys elatoides is only known from the Mount Holland district within the Coolgardie bioregion of Western Australia, and is currently recognised from 13 records (Western Australian Herbarium, 2025) (Figure 2). It grows on sandy loam soils, sometimes with lateritic pebbles at the surface in species-rich communities of open mallee woodland over dense shrubs (Wilson & Hislop, 2020). Associated species include: *Eucalyptus burracoppinensis, E. incrassata, Allocasuarina acutivalvis, A. spinosissima, Grevillea cagiana, Hakea erecta, Phebalium megaphyllum, Melaleuca pungens, M. laxiflora, M. cordata* and *Gompholobium hendersonii*.

Microcorys elatoides is listed as a Priority One species under Conservation Codes for Western Australia Flora (Smith and Jones, 2018). Although locally common, *Microcorys elatoides* is specimens are known from a restricted area of the Mount Holland district, including within and around an active mining lease (12 occurrences). Since its listing as a Priority One, *Microcorys elatoides* has been recorded within DBCA lands managed for conservation, with one formally recognised occurrence within Jilbadji Nature Reserve (Western Australian Herbarium, 2025).

Plate 1. *Microcorys elatoides* (P1) in the Mount Holland area

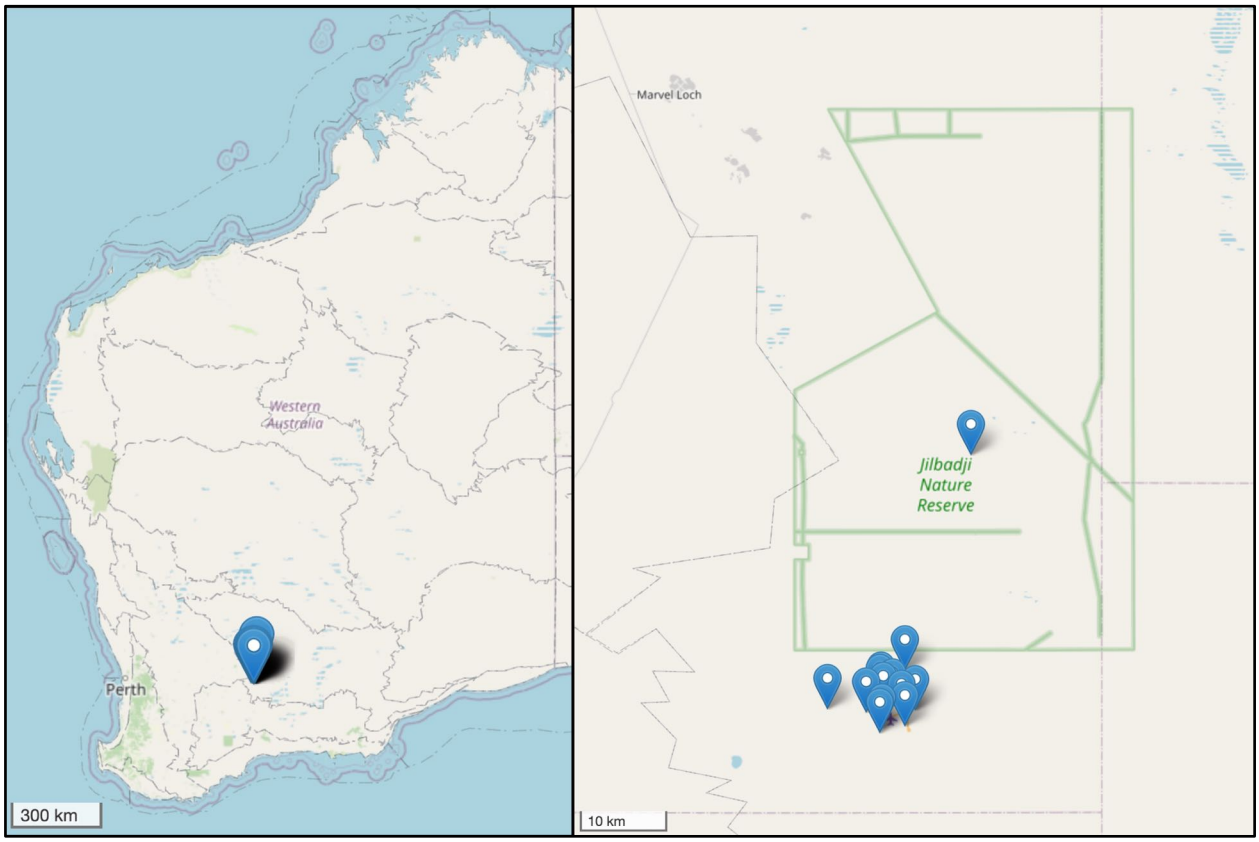

Figure 2. Distribution of *Microcorys elatoides* (P1) (WA Herbarium 1998-2025).

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2.3. Observations of Plant Morphology and Post-fire Regeneration

During surveys in the Mount Holland region since 2019, Western Botanical has observed many features of *Microcorys elatoides* including resprouting from a substantial subterranean lignotuber, and germinating freely from soil stored seeds. Specifically: (i) when scoring a 2023 burn quadrat (Q2023_01ME) before a winter rainfall event, resprouting plants were prolific across the fire affected area. Excavation of individuals revealed a thick corky bark layer surrounding the root system, which presumably protects the root system from fire events (Plate 2); (ii) abundant seedling recruitment was observed in areas adjacent to the Marvel Loch – Forrestania Road where a DBCA installed Strategic Firebreak intercepted populations of *Microcorys elatoides*; and (iii) profuse flowering events have also been observed in mature plants, with upwards of 100 flowers per plant following good seasonal conditions (e.g. winter rainfall).

In areas where soil has been disturbed by earlier exploration and mining activities, *Microcorys elatoides* (P1) has been observed to germinate and establish on tracks and areas where the soil has been physically worked. This suggests that such movement of soil can trigger germination of soil stored seeds by damaging the soil seed coat. Mattiske Consulting has previously reported *Microcorys elatoides* growing in post-fire recovering vegetation and on disturbed lands, commonly old drill tracks and pads (Mattiske, 2021a).

Plate 2. Resprouting *Microcorys elatoides* in recently burnt areas (6 months post 2023 fire)

These observations indicate that *Microcorys elatoides* is a quintessential geosporous re-seeder and resprouter.

2.4. Fire History

Fires are a natural part of the region, with frequent and repeated fires leading to a complex of post-fire regeneration regimes. Most fires in the region are caused by lightning strikes, with other sources of ignition including road traffic, powerlines, and agricultural operations (DEC, 2010). Lightning induced fire events have frequently occurred in southwestern Western Australia, and has led to the development of fire-resistant species, such as *Microcorys elatoides* (P1) (Bell, 2001). To adapt to the pressure of frequent fires, flora of the southwest have adopted one of two major fire-response syndromes as resprouters or reseeders (Bell, 2001). The post-fire presence of resprouting species such as *Microcorys elatoides* (P1), depends predominantly on individual survival by subterranean or aerial regenerative buds (Bell, 2001). Resprouters tend to have rapid recovery post-fire and immediate capacity to outgrow and outcompete establishing seedlings (Bell, 2001).

Typically, after a fire event, there is an initial increase in species richness and diversity which is greatest when the vegetation simultaneously contains resprouting and reseeding species (Bell, 2001). This increase is followed by a gradual decline (in plant numbers), predominantly due to a decline in living representatives (Bell, 2001). In plant communities with a high proportion of resprouter species, plant cover and biomass increase rapidly postfire and levels-off after five to ten years when biomass reaches pre-burn levels (Bell, 2001). Hobbs and Atkins (1990) found that timing of a fire event effects the rate and type of recovery. Following Autumn fire events, successful establishment of reseeding species is promoted as seeds are released shortly before conditions become favourable for germination, and less regrowth of resprouting species is observed (Hobbs and Atkins, 1990). In comparison, spring fires tend to promote regrowth of resprouting species, with the regeneration of reseeding species being virtually absent (Hobbs and Atkins, 1990). Resprouter species populations are multi-aged, with seedlings only surviving if they germinate early in the inter-fire interval (Bell, 2001).

Since 1969 there have been seven fires in the Mount Holland region that have affected known *Microcorys elatoides* (P1) populations: September 1969, January 1994, February 2002, January 2008, November 2013, November 2015, and November 2023. In particular, the 1969 and 2013 fires burnt through a large area of today's Development Envelope and Life of Mine Footprint (Figure 3).

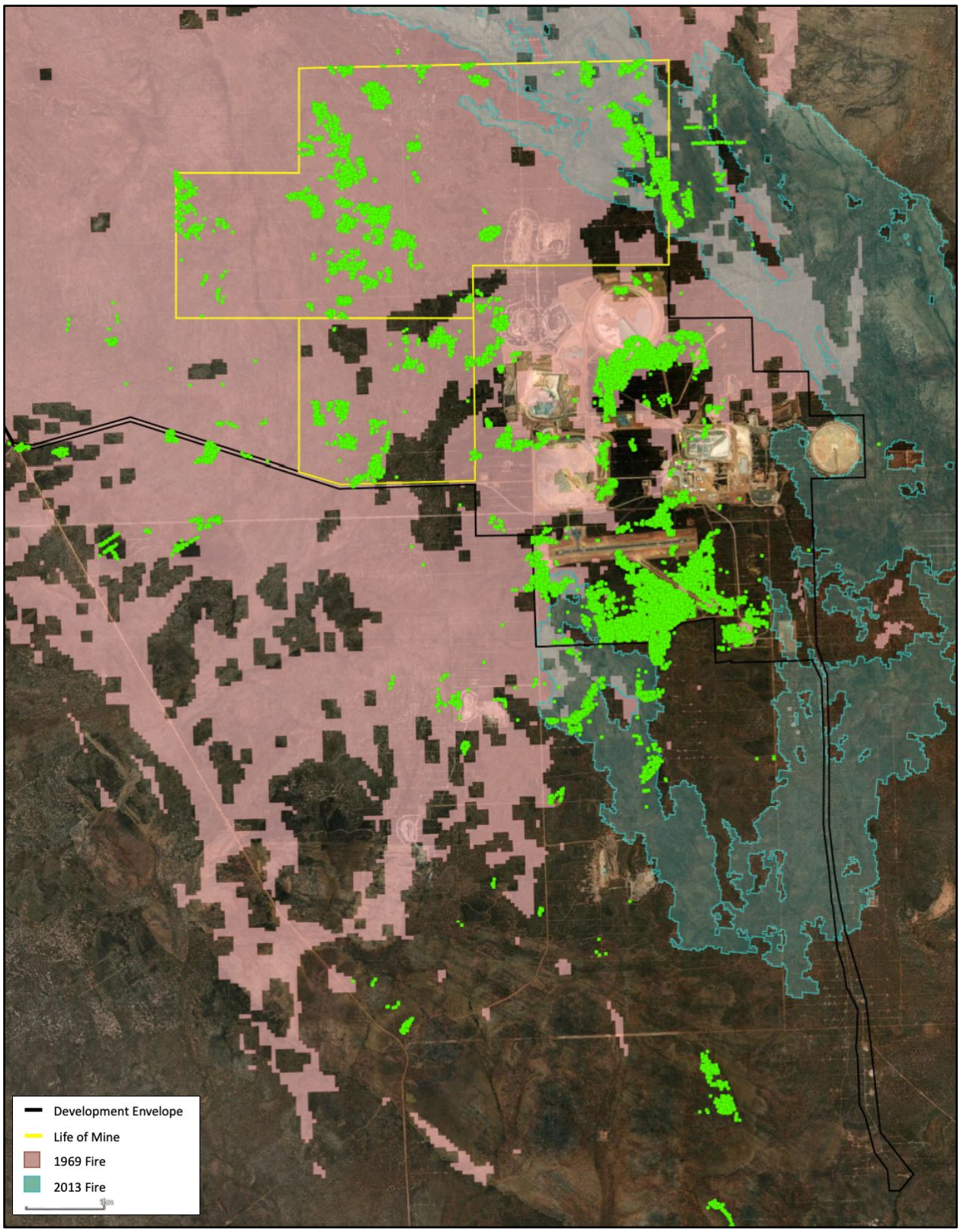


Figure 3. Extent of 1969 and 2013 fires across the Development Envelope and Life of Mine footprints, showing *Microcorys elatoides* populations

2.5. Previous Surveys and Geographic Range of *Microcorys elatoides*

During surveys of the Minesite Development Envelope surveys, Mattiske Consulting extended the known distribution of *Microcorys elatoides* by 28 km north and 14 km west of the DE (Mattiske, 2019). Western Botanical has further extended the known distribution of *Microcorys elatoides* to 36 km west and 17 km south of the Development Envelope (Figure 5).

Since 2018, numerous surveys involving *Microcorys elatoides* (P1) have been conducted within the EGLP Development Envelope, Life of Mine, and in the surrounding region by environmental consultancies for Covalent Lithium at the Mount Holland site (Table 1). As a result of these surveys for the EGLP a total of 364,547 *Microcorys elatoides* have been recorded to date in the Mount Holland area (Table 1, Figure 5). Of this, 90,857 *Microcorys elatoides* were recorded within the EGLP Development Envelope and Life of Mine Footprint (Figure 4).

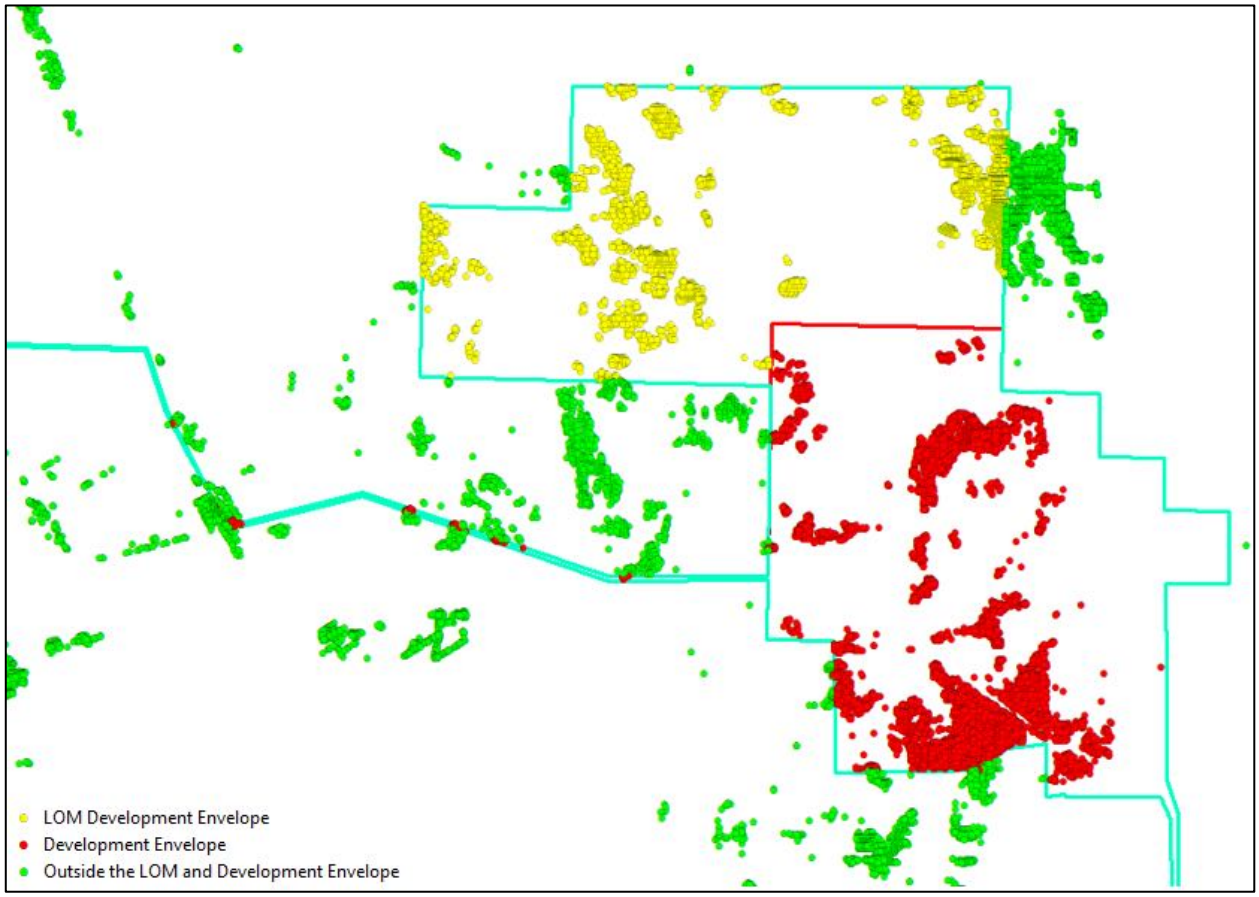


Figure 4. Distribution of *Microcorys elatoides* (P1) records within the Development Envelope and Life of Mine Footprint

Figure 5. Distribution of *Microcorys elatoides* (P1) Records from Surveys for the Mount Holland Project

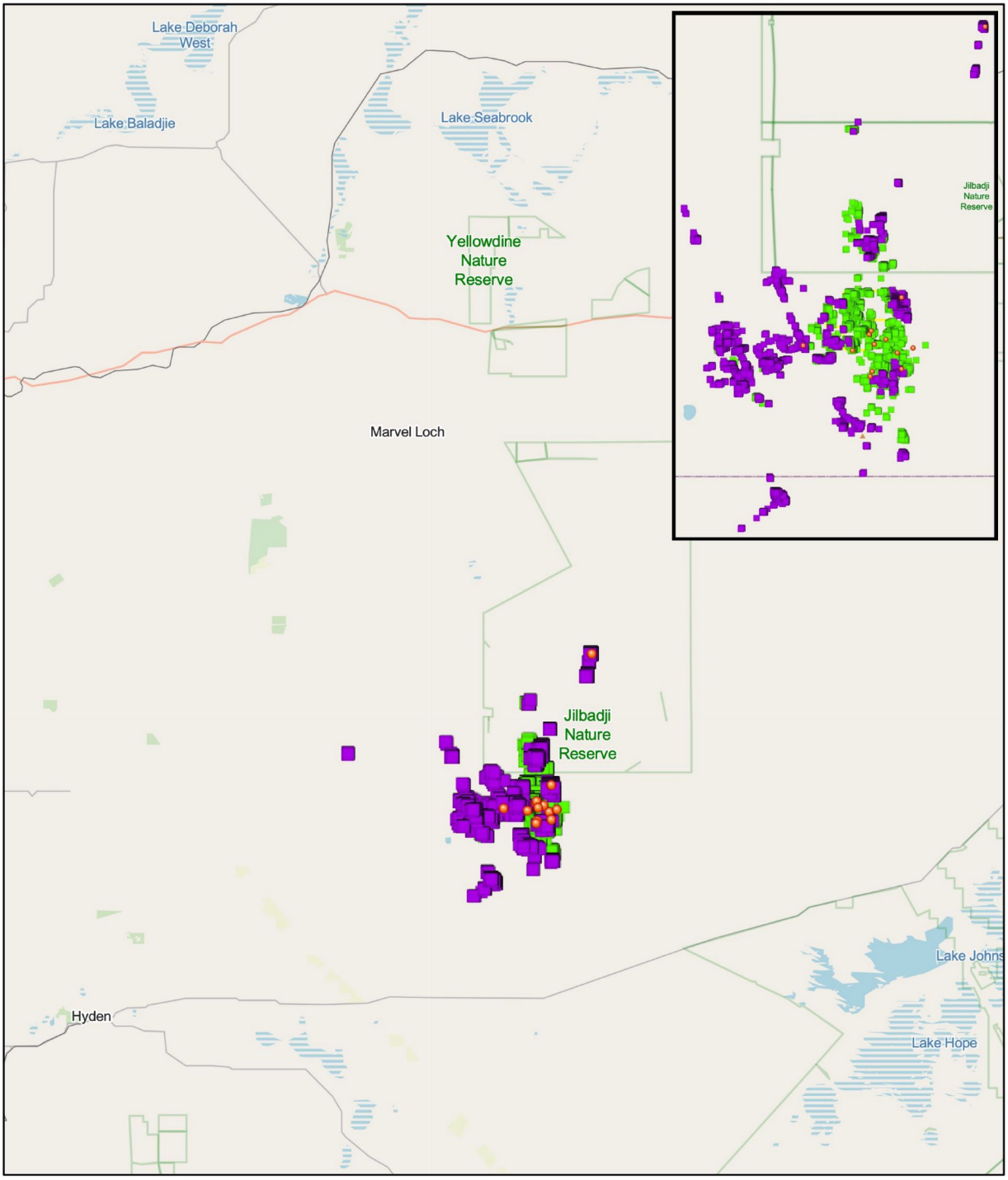

Lake Deborah West
Lake Baladjie
Lake Seabrook
Yellowdine Nature Reserve
Marvel Loch
Jilbadji Nature Reserve
Jilbadji Nature Reserve
Lake Johns
Hyden
Lake Hope
1:1,155,581
0 5 10 20 mi
0 12.5 25 50 km
FloraBase Records
Western Botanical Records
Other Records
Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and its affiliates, Esri Community Maps contributors, Map layer by Esri
Western Botanical
Source: Esri, European Commission, European Space Agency, Amazon Web Services © Commonwealth of Australia (Geoscience Australia) 2016. This product is released under the Creative

Table 1. *Microcorys elatoides* (P1) surveys for the EGLP from 2018 to 2024

Consultancy	Survey Year	Area Surveyed			Total
		Development Envelope	Life of Mine	Outside DE and LOM	
360 Environmental Pty Ltd	2019	-	697	2,396	3,093
AECOM Australia Pty Ltd	2019	-	-	8,118	8,118
	2020	-	-	5,064	5,064
	2022	21	-	1,021	1,042
	2023	12	-	3,644	3,656
	2024	-	7	2,691	2,698
BDCA Additional Data	2023	-	-	16	16
GHD Pty Ltd	2019	-	-	87	87
	2020	-	359	12	371
Mattiske Consulting Pty Ltd	<2018	896	5	27	928
	2018	5,720	-	2,507	8,227
	2019	30,985	11	6,753	37,749

Consultancy	Survey Year	Area Surveyed			Total
		Development Envelope	Life of Mine	Outside DE and LOM	
	2020	5,401	14	864	6,279
	2021	62	1,397	685	2,144
	2022	-	10,531	482	11,013
	2023	-	27,225	-	27,225
Strategen-JBS&G	<2018	-	-	16	16
	2019	-	-	11,943	11,943
Western Botanical	<2019	-	20	615	635
	2020	9	-	287	296
	2021	-	7,216	180	7,396
	2022	10	-	16,866	16,876
	2023	159	54	96,966	97,179
	2024	46	-	112,450	112,496
Total		**43,321**	**47,536**	**273,690**	**364,547**

2.6. Current Survey

In recent discussions with the Department of Biodiversity, Conservation and Attractions (DBCA), it is understood that it is common practice to assess proportional impacts on mature reproductive plants in environmental impact assessments.

The development of the EGLP will likely impact more than the currently approved 7,962 *Microcorys elatoides* P1 plants (MS1199). Current proposals show direct impacts to 41,218 plants (7,962 in MP121883, 33,354 in the LOM), representing 11.31% of the total known number of *Microcorys elatoides* plants. This number would have included seedlings and young plants.

It is understood that the DBCA is open to reviewing the overall number being taken to remove seedlings and immature plants from the total for the purpose of Impact Assessment. DBCA is also prepared to look at proposed proportional impacts to the Area of Occupancy (AOO) of *Microcorys elatoides,* rather than just a numbers of plants calculation.

The hypothesis leading to this demographic assessment was "as the Development Envelope and Life of Mine Footprint were surveyed soon after fire, the counts of *Microcorys elatoides* may not be representative of a long-lived population due to large numbers of seedlings diminishing over time as vegetation matures leaving few scattered older mature plants in future long unburnt vegetation. An understanding of the demography of *Microcorys elatoides* populations at various ages post last fire was deemed necessary to assess the changes in numbers of seedlings, young plants and mature multi-stemmed plants over time."

Western Botanical has been conducting regional surveys for a wide range of Priority flora outside the proposed EGLP Development Envelopes and have recorded significant numbers, and extended the range of, *Microcorys elatoides* in that time. Very few *Microcorys elatoides* (P1) populations outside the mine footprint remain unsurveyed, and those that remain so are small in area, generally contain low numbers of large mature multi-stemmed plants, and most are in long-unburnt vegetation with limited ready access.

Covalent Lithium commissioned Western Botanical to conduct a demographic study of *Microcorys elatoides* over all available vegetation of differing fire ages.

The aim of the demographic study was to:

1. Investigate the effects of fire disturbance on *Microcorys elatoides* populations in the observable size-classes;

2. Calculate the size-class composition of *Microcorys elatoides* populations recorded in the Development Envelope and Life of Mine at time of survey; and

3. Calculate how the impacted number of *Microcorys elatoides* by the EGLP would change if reproductively immature plants at the time of survey were disregarded.

3. Methods

3.1. Field Survey Methods

For context and a better understanding of how data was collected, in all off-tenement Targeted Flora Surveys for Covalent Lithium's EGLP project, the following methodology was employed.

Flora surveys within the flowering period of many species were regarded as being essential to effective assessment and where this was the case, those species were only targeted during their respective flowering periods. The allocation of human resources and timing of flora surveys was carefully managed so that optimal survey results would be likely. This means that particular areas often had to be assessed at least twice, sometime three times, in a given season as the flowering phenology of the numerous targeted species progressed, meaning that as some species finished flowering, others would commence flowering. This applied to species flowering in early Spring such as *Balaustion grandibracteatum* subsp. *junctura* (P2), *Balaustion grandibracteatum* subsp. *grandibracteatum* (P3) and diminutive species such as *Gompholobium cinereum* (P3). Species requiring survey in late Spring to early summer included most *Verticordia* species other than *Verticordia stenopetala* (P3) which could be recognised outside flowering. Typically, *Chamelaucium* sp. Mt Holland (G. Cockerton & G. Grigg WB40918) (P1), *Thryptomene jilbadji* (P1) and *Verticordia* species were the last to flower in late Spring to early Summer (Nov-Dec) each year.

Field teams were led by experienced, senior botanists familiar with the significant flora of the region. Staff were all made aware of the significant flora being targeted within a particular survey area and reference specimens were either viewed (in the case of *Banksia dolichostyla* (T)) or reference specimens of Priority or otherwise significant flora were viewed and/or collected by staff for ready confirmation of taxa encountered during survey. A comprehensive Reference Field Herbarium was maintained and available to the team during surveys for further morphological review of specimens.

During field surveys, team members walked pre-determined parallel traverses shown on the iPads at 10m spacings, each operator effectively covering a 10m wide swathe. Typically recording points were made every 5m to 10m within a given transect line.

Within vegetation of a given fire-age (years since last known fire), plants of each target species generally conformed to a single size class, *i.e.* plants observed were largely uniform in size and therefore assumed age.

This was particularly the case for species which are obligate re-seeder species which regenerate from soil-stored or canopy stored seed following a fire. Examples of this are *Chamelaucium jilbadji* (P1) and *Chamelaucium* sp. King Ingram Road (G. Grigg WB40916) (P1).

In the case of resprouter species such as *Microcorys elatoides* (P1), it was very difficult to distinguish seedlings from small resprouted plants. In these cases, both appear as small single-

stemmed plants and may have been in the order of 10 to 40 cm tall and the presence of a small resilient root stock was not able to be discerned until the base of the plant was excavated or the plant was removed to investigate the rootstock. This was clearly not feasible in other than a few specific cases where plant growth was reviewed. Older plants with a significant lignotuber were readily recognised but were in the minority in areas that had been recently burnt (within the last 2 to 3 years).

In all cases, the numbers of observed target plants were counted as one size class, or estimated in the case of large numbers, and values entered directly into iPads running ARCGIS FieldMaps®. High resolution satellite imagery on the iPads ensured location of collection was correctly recorded with a typical estimated positional error of +/- 2.5m.

Data was uploaded at the end of each work day to the CAD Resources Pty Ltd ESRI Server and reviewed daily and at the end of a field survey by the field team leader before being synthesized into the Covalent Significant Flora Database held by CAD Resources Pty Ltd.

Specimens of significant flora were collected on an ad-hock basis for vouchering at the WA Herbarium. Some specimens have already been vouchered while others are awaiting delivery to WAHERB.

As the methods of counting individuals of *Microcorys elatoides* outside the proposed EGLP Development Envelope and mine footprint are essentially equivalent to those used within EGLP Development Envelope and mine footprint, we believe the numbers within and outside the DE and mine footprint can be compared directly.

3.2. Field Survey Dates and Effort

Field survey for the Demographic Study reported here was conducted differently to the regional surveys reported elsewhere. Great care was taken to determine the likely age of plants within each sample area (quadrat) assessed so that numbers of plants within the four size classes could be relatively confidently recorded and reported.

The fieldwork for this specific study were conducted across four field trips in 2024 between 20th June to 9th December by various Western Botanical botanists and field assistants (Table 2).

Table 2. Survey dates and corresponding personnel for *Microcorys elatoides* quadrats in 2024

Survey Dates	Personnel
20th to 22nd June	Douglas Lievense, Gemma Grigg and Natacha Issler
15th to 20th July	Douglas Lievense, Felicity Keet, Gemma Grigg and Natacha Issler
30th July to 1st August	Douglas Lievense, Gemma Grigg and Natacha Issler
9th December	Douglas Lievense and Natacha Issler
Total Effort	44 person-days

Purposive non-probability sampling was used to select the locations of each quadrat under two criteria: a recorded fire event occurring, and *Microcorys elatoides* (P1) being present. Quadrat locations were first selected at a broad scale on the known occurrence of *Microcorys elatoides*, using regional and Western Botanical data. Using ArcGIS Online, *Microcorys elatoides* location data was overlayed on DBCA Fire History dataset and identified that the species coincides with nine fire events: 1969, 1994, 2002, 2008, 2012, 2013, 2015, 2017, and 2023. The area in which *Microcorys elatoides* cooccurs with the burn area of the 2012 fire was insufficient in size for quadrat placement and was disregarded as a sample area. The 2017 burn area was also disregarded as it was due to contained chaining and burning along a portion of the Marvel Loch-Forrestania Road for fire management with significant soil disturbance which can affect seed germination, and not representative of a 'spontaneous' natural fire event.

Based on the above selection criteria, up to five 20 x 20 m quadrats were established at 22 unique sites, representing each recognised fire age category, for a total of 82 quadrats established (

Table 3). Corners were marked using metal fence droppers and measuring tapes to demarcate corners and boundaries (Figure 6). Where possible, a minimum of five representative quadrat sites per fire age were installed, taking care to avoid disturbed or interzonal areas. Data pertaining to the following parameters were recorded into notebooks and iPads at each quadrat site:

General: Fire age, date, and persons recording;

Location: Unique site number, and coordinates and site location recorded on iPads using ArcGIS Field Maps, Datum GCS WGS 1984 (accuracy ± 5 m);

Population: Counts for each size class of *Microcorys elatoides* (seedling, single stemmed, multi-stemmed, and senescent) present within quadrat.

Table 3. Quadrats Established

Unique Site #	Year of Last Fire Event	Quadrats within Sites	Sample Size	Date Sampled	Survey Season
4	1969	Q2 – 5	4	15th July 2024	Winter
9	1969	Q8 & 9	2	17th July 2024	Winter
10	1969	Q10 – 13	4	17th July 2024	Winter
11	1969	Q14 & 15	2	17th July 2024	Winter
19	1969	Q1 & 7	2	1st August 2024	Winter
20	1969	Q6	1	1st August 2024	Winter
1	1994	Q1 – 5	5	20th – 21st June 2024	Winter

Unique Site #	Year of Last Fire Event	Quadrats within Sites	Sample Size	Date Sampled	Survey Season
12	1994	Q6 – 10	5	19th July 2024	Winter
14	1994	Q11 – 15	5	20th July 2024	Winter
16	2002	Q1 – 5	5	30th July 2024	Winter
3	2008	Q1 – 5	5	22nd June 2024	Winter
17	2008	Q6 – 10	5	30th to 31st July 2024	Winter
18	2008	Q11 – 15	5	31st July 2024	Winter
2	2013	Q1 – 5	5	21st June 2024	Winter
5	2013	Q7 – 9	3	15th July 2024	Winter
15	2013	Q11 – 15	5	20th July 2024	Winter
21	2013	Q6 & 10	2	1st August 2024	Winter
7	2015	Q6 – 10	5	16th to 18th July 2024	Winter
8	2015	Q1 – 5	5	16th to 19th July 2024	Winter
13	2015	Q11 – 15	5	19th July 2024	Winter
6	2023	Q1	1	16th July 2024	Winter
22	2023	Q2 – 5	4	9th December 2024	Summer
TOTAL			**82**		

Microcorys elatoides (P1) plants were categorised into four size classes (Plate 3):

1. Seedlings: single stemmed plants from 1 cm to 20 cm tall with thin basal stems, likely being newly established from seeds following recruitment event;

2. Single Stemmed Plants: established plants greater than 20 cm tall, with one above-ground stem; likely reproductive but not fully developed, either growing from previously germinated seed or resprouted from single-stemmed plant with a thickened, corky bark on stem 3 to 5 cm below ground level;

3. Multi-stemmed Plants: plants from 1 cm high to 1.5m high, multiple above-ground stems arising from a lignotuber below ground; and

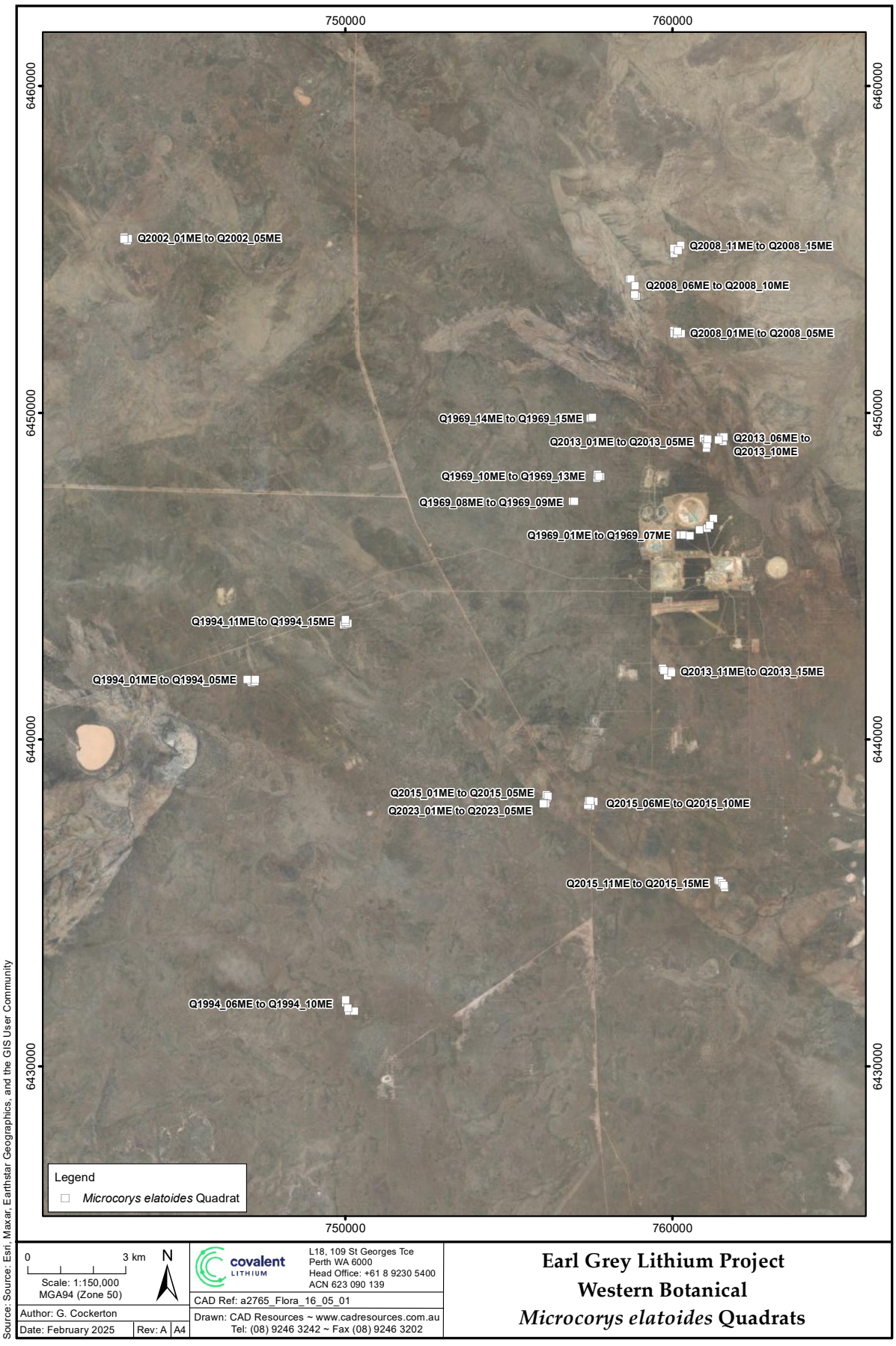
4. Senescent Plants - aging multi-stemmed plants to 1.5m tall with all or most branches collapsed and some green foliage present, likely at the end of their life cycle.

Plate 3. *Microcorys elatoides* (P1) size classes. A – Seedling <20 cm tall; B – Multi-stem plant, long unburnt; C – Multi-stem plant, recently burnt resprouting from lignotuber. Senescent and single stem plants not pictured.

Care was taken into categorising *Microcorys elatoides* (P1) in recently burnt areas (2023 fire) as some plants appeared to be seedlings or single stemmed plants, but upon further investigation were found to be resprouting from a lignotuber. These plants were categorised as multi-stemmed plants.

As *Microcorys elatoides* (P1) can often grow in dense clusters or amongst other flora, careful inspection of plants was undertaken to help ensure individual plants were not overlooked. Care was also taken when counting seedlings and small resprouting plants in high concentration areas (i.e. recently burnt areas), with the soil marked next to counted plants.

Figure 6. Quadrat locations


750000
760000
6460000
6450000
6440000
6430000
Q2002_01ME to Q2002_05ME
Q2008_11ME to Q2008_15ME
Q2008_06ME to Q2008_10ME
Q2008_01ME to Q2008_05ME
Q1969_14ME to Q1969_15ME
Q2013_01ME to Q2013_05ME
Q2013_06ME to Q2013_10ME
Q1969_10ME to Q1969_13ME
Q1969_08ME to Q1969_09ME
Q1969_01ME to Q1969_07ME
Q1994_11ME to Q1994_15ME
Q1994_01ME to Q1994_05ME
Q2013_11ME to Q2013_15ME
Q2015_01ME to Q2015_05ME
Q2023_01ME to Q2023_05ME
Q2015_06ME to Q2015_10ME
Q2015_11ME to Q2015_15ME
Q1994_06ME to Q1994_10ME
Legend
Microcorys elatoides Quadrat
0
3 km
N
Scale: 1:150,000
MGA94 (Zone 50)
Author: G. Cockerton
Date: February 2025
Rev: A
A4
covalent LITHIUM
L18, 109 St Georges Tce
Perth WA 6000
Head Office: +61 8 9230 5400
ACN 623 090 139
CAD Ref: a2765_Flora_16_05_01
Drawn: CAD Resources ~ www.cadresources.com.au
Tel: (08) 9246 3242 ~ Fax (08) 9246 3202
Earl Grey Lithium Project
Western Botanical
Microcorys elatoides Quadrats
Source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

3.3. Area of Occupancy and Extent of Occurrence

For the purpose of calculating Area of Occupancy, AOO, an area of 5 m radius was applied to each data point recording *Microcorys elatoides* in the numerous field surveys conducted for the EGLP using the Arc GIS CAD package. The measure of 5m was chosen as this was regularly noted as the appropriate range for which plants of *Microcorys elatoides* could be assessed in Targeted Surveys for the species within the vegetation near Mt Holland.

The Extent of Occurrence was calculated by encompassing all recorded data points for *Microcorys elatoides* within one polygon, using the Arc GIS CAD package.

All CAD assessments were undertaken by CAD Resources Pty Ltd.

4. Results and Discussion

4.1. Numbers of plants of *Microcorys elatoides* as a measure of Impacts

The overall recorded population of *Microcorys elatoides* to March 2025 stands at 364,547 plants. Eight of these have already been taken within the MS1199 (Marvel Loch – Forrestania Road alignment) footprint and 3,070 have already been taken within the CPS10049 (Marvel Loch – Forrestania Road alignment) footprint. This leaves a total extant population of 361,469 plants as at March 2025.

In the planned development of the EGLP, plants to be taken include: 7,962 within MP121883 (approved number to be taken within the mine footprint) and 33,354 within the Life of Mine (LOM) footprint. These represent 2.18% and 9.15% of the overall known population of *Microcorys elatoides* respectively. These are summarised in Table 4.

Table 4. Summary Impacts to Microcorys elatoides through development of the EGLP

	Extant		**Taken**	
Numbers of plants of *Microcorys elatoides*	**# of Plants**	**%**	**# of Plants**	**%**
Microcorys elatoides overall plants recorded	364,547	100.00%		
Microcorys elatoides plants already taken in MS1199			8	0.00%
Microcorys elatoides plants already taken in CPS10049			3,070	0.84%
Total *Microcorys elatoides* already taken prior to March 2025			**3,078**	**0.84%**
***Microcorys elatoides* plants Extant at March 2025**	**361,469**	**99.16%**		
Microcorys elatoides plants proposed to be taken in MP121883			7,962	2.18%
Microcorys elatoides plants proposed to be taken in LOM			33,354	9.15%
Total number of *Microcorys elatoides* proposed to be taken (MP121883 + LOM)			**41,316**	**11.33%**
Total number of *Microcorys elatoides* Remaining Extant After Project Implementation (MP121883 + LOM)	**320,153**	**87.82%**		

Summary data collected during this assessment is presented in the following tables and graphs.

4.2. Statistical Analysis of Plant Numbers

Plant density (plants per ha) was used to assess the relationship between *Microcorys elatoides* (P1) counts and time since fire event. Before statistical tests were performed, Box and Whisker plots were generated to assess for outliers within the dataset. Data falling more than 1.5 times outside the interquartile range were considered outliers. Outliers were then investigated and excluded from statistical analyses if they were due to errors in data entry, measurement or sampling. Outliers that were due to natural variation were not excluded from the data sets.

The mean density of each size class within each of the seven recorded fire ages was used to calculate the total density per fire age, and estimate the percentage distribution of each size class for the surveyed fire ages. The difference in average percentage distribution of each size class between fire ages was used to calculate the estimated percentage change per size class for every one-year increase in fire age. This was calculated by finding the difference in percentage distribution between two recorded years and dividing it by the number of years between the two points. For example, seedling percentage distribution increases by 14.38% between one to nine years post fire, this equates to an increase in seedlings of 1.80% increase per year between one to nine years post fire.

Given the data had skewed distributions, multiple outliers due to natural variation, and multiple fire age classes with small sample sizes (<10 replicates), the non-parametric test methods of Kruskal-Wallis and Wilcoxon Rank Sum Test were used.

All analyses were performed using RStudio Version 2024.12.0+467 analysis software. The statistical tests performed are as follows, with the alpha level for all tests set at 0.05:

- The Kruskal-Wallis test method was used to investigate significant differences between *Microcorys elatoides* (P1) counts for each size class and when size classes were combined across fire ages.

- If the Kruskal-Wallis test found a significant difference between fire ages, a post-hoc pairwise Wilcoxon Rank Sum Test was used to assess difference in plant density between fire ages for each size class and overall density (size classes combined), and determine which specific fire ages are statistically significant different from another.

Polynomial regression analysis was used to model the relationship between size class and time since fire, and capture non-linear trends such as rapid growth post fire followed by population stabilisation. As the relationship between plant density and time since fire is non-linear and complex, a polynomial equation was fitted to the data. To avoid over-fitting, a second-degree polynomial regression (quadratic) was used as the data didn't demonstrate a need for added complexity of a cubic curve.

4.3. Outliers

The Box and Whisker plots highlighted 16 major outliers, using the default outlier decision rule of a value extending more than 1.5 times the interquartile range past the whiskers (Table 5). Investigation into identified outliers determined three causes: sampling, data entry, and natural variation. Three outliers were attributed to erroneous data collection and removed from the analysis, while a further 12 were identified as natural variation and were retained.

Table 5. Outliers identified and result of investigation

Quadrat #	Error Type	Included/Excluded	Comment
Q1969_01ME	Sampling	Excluded	Outside 1969 burn area
Q1969_07ME	Sampling	Excluded	Outside 1969 burn area
Q1994_06ME	Data Entry	Excluded	Conflicting data recorded on iPad and master spreadsheet
Q1994_08ME	Natural Variation	Included	Outlier size class: seedlings
Q1994_09ME	Natural Variation	Included	Outlier size class: senescent plants
Q1994_10ME	Natural Variation	Included	Outlier size class: senescent plants
Q2002_02ME	Natural Variation	Included	Outlier size class: multi-stem and senescent plants
Q2002_04ME	Natural Variation	Included	Outlier size class: multi-stem plants
Q2002_05ME	Natural Variation	Included	Outlier size class: seedlings Satellite imagery suggests more open vegetation than other 2002 quadrats.
Q2008_01ME	Natural Variation	Included	Outlier size class: multi-stem plants
Q2008_05ME	Natural Variation	Included	Outlier size class: seedlings
Q2013_08ME	Natural Variation	Included	Outlier size class: single stem plants
Q2015_01-05ME	Natural Variation	Included	Outlier size class: seedlings. Previously burnt in 1969 and 1994. Not removed based on assumption that sufficient time had lapsed for vegetation to return to pre-fire state. No studies published on reproductive timing of *Microcorys elatoides*.
Q2015_14ME	Natural Variation	Included	Outlier size class: multi-stem plants

Quadrat #	Error Type	Included/Excluded	Comment
Q2023_01ME	Sampling	Excluded	Scored <1 year post fire before seedling recruitment event occurred. Not representative of one year post fire.
Q2023_03ME	Natural Variation	Included	Outlier size class: single stem plants

4.4. Plant Density Overview

Comparison of mean plant density (plants per ha) across the seven recorded fire ages shows that the overall average density of *Microcorys elatoides* (P1) reduces over time, from around 10,331 plants per ha present at one year post fire to around 4,029 plants per ha present at 55 years post fire (Figure 7).

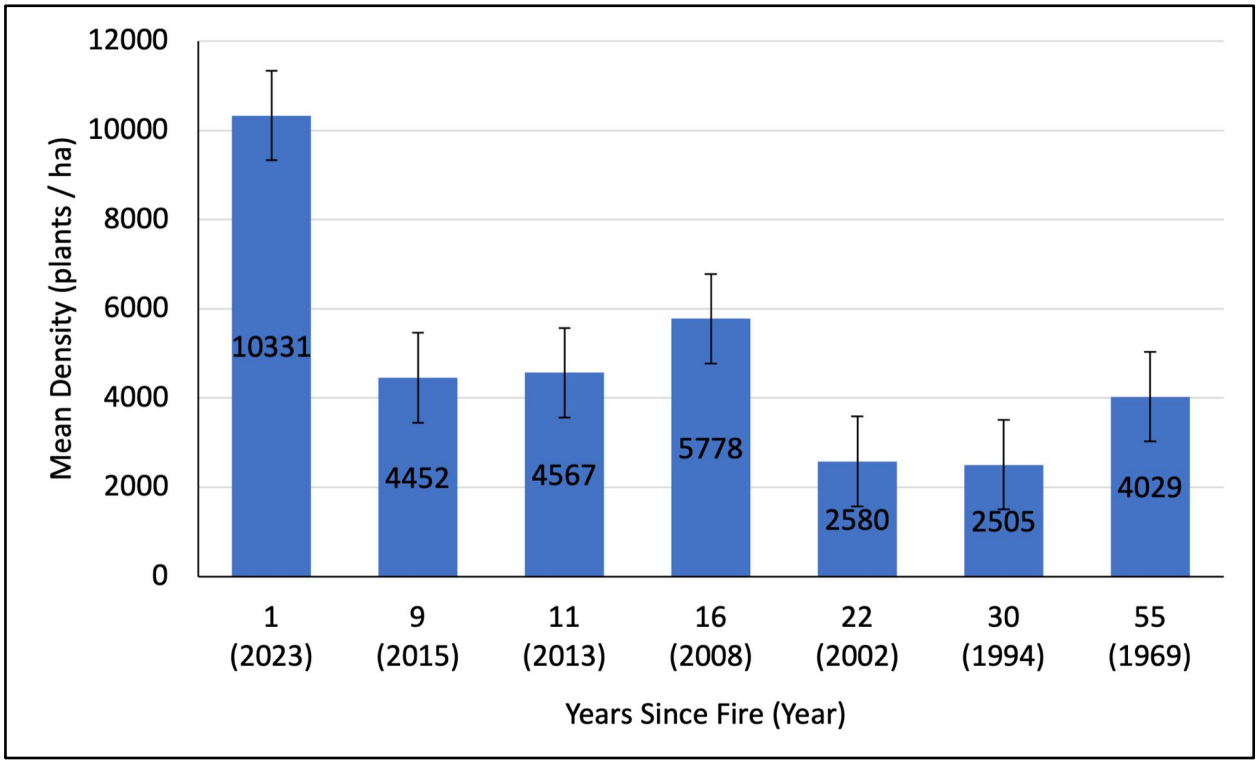


Figure 7. Mean (± SE) *Microcorys elatoides* (P1) density (plants per ha) between study phases (size classes combined).

Major influences on plant density observed are considered to include the following:

- Density of seedling and single stem plants increases between one to 11 years post fire, indicating that seedling recruitment and growth of single stem plants is dependent on the occurrence of recruitment events and that these are observable as seedlings for this time frame, Figure 8.

- The observed decline in seedling density from 11-years post fire could be due either to mortality due to factors such as being outcompeted, or maturation of these plants causing them to be counted in other size classes, likely the single-stemmed plants group.

- High numbers of multi-stemmed plants were recorded in the 'one year post fire' age group, even more so than numbers of seedlings or single-stem plants. It is suggested that this likely due to plants resprouting shortly after a fire event being multi-stemmed, *i.e.* the fire event may have triggered the multi-stemmed growth habit from previously single stemmed plants, and these were more readily counted and observed in the period up to one year after fire. Seedlings less than a year old are small and difficult to observe in the field.

- The density of multi-stemmed *Microcorys elatoides* plants was variable within the fire-ages assessed, however, it is the most dominant size-class in any fire age.

- The increase in senescent plant density likely reflects the aging and decline of mature multi-stemmed plants over time.

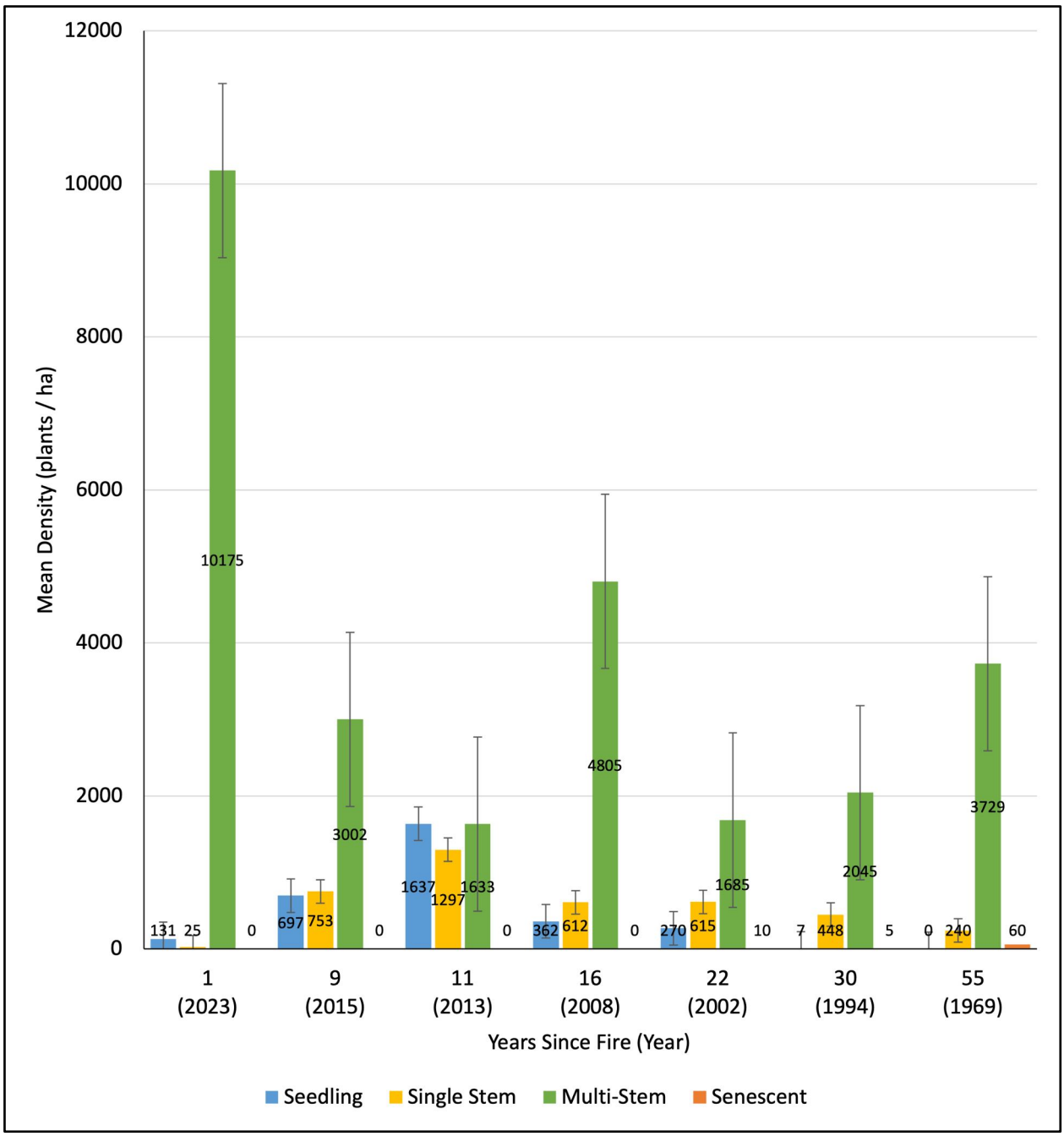


Figure 8. Mean (± SE) *Microcorys elatoides* (P1) density (plants per ha) across fire ages, categorised by size classes.

Using the average density of *Microcorys elatoides*, we can estimate the size-class composition of a population for each recorded fire age (Table 6) (Figure 9). These indicate that on average:

- Multi-stemmed plants dominate the composition of a *Microcorys elatoides* population at any age.
- Single-stemmed plants are generally the second dominant size class (with the exception of one year post fire), despite variability at sites assessed.
- The percentage of seedlings population increases from years 1 to 11 and then declines rapidly between 11 years (35.84%) and 16 years (6.26%) post-fire.

- Whilst numbers of senescent plants increase over time, it remains relatively low (1.48% at 55 years), indicating longevity of mature plants.

These results may be useful for estimating the composition of *Microcorys elatoides* populations from one year post-fire ages to fully mature (55 years post fire).

Table 6. Average count and percentage distribution of plants per size class across fire ages

Years Since Fire (Fire Year)	1 year (2023)	9 years (2015)	11 years (2013)	16 years (2008)	22 years (2002)	30 years (1994)	55 years (1969)
Seedlings	1.27% (131)	15.65% (697)	35.84% (1,637)	6.26% (362)	10.47% (270)	0.29% (7)	0% (0)
Single Stems	0.24% (25)	16.92% (753)	28.39% (1,297)	10.59% (612)	23.84% (615)	17.89% (448)	5.97% (240)
Multi-Stems	98.49% (10,175)	67.43% (3,002)	35.77% (1,633)	83.16% (4,805)	65.31% (1,685)	81.61% (2,045)	92.55% (3,729)
Senescent	0% (0)	0% (0)	0% (0)	0% (0)	0.39% (10)	0.21% (5)	1.48% (60)
Total	100% (10,331)	100% (4,452)	100% (4,567)	100% (5,778)	100% (2,580)	100% (2,505)	100% (4,029)

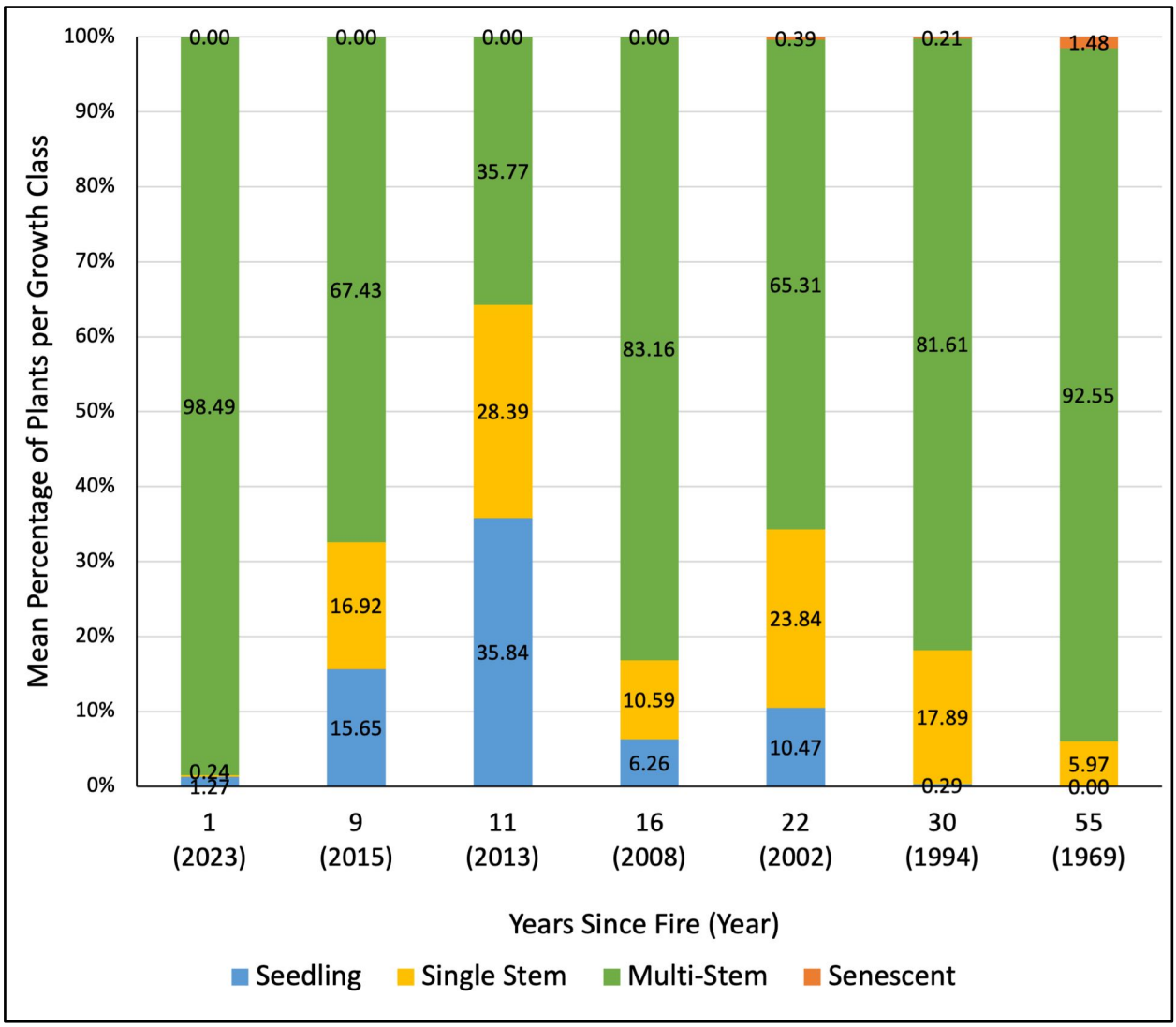


Figure 9. Average percentage distribution of plants per size class across fire ages

A breakdown of the estimated percentage change per year from one to 55 years post fire is shown below in Table 7.

Table 7. Breakdown of percentage change in average distribution of plants per size class across fire ages

	1 year (2023)	Total Difference	Difference per year	9 years (2015)	Total Difference	Difference per year	11 years (2013)	Total Difference	Difference per year	16 years (2008)
Seedlings	1.27%	14.38%	1.80%	15.65%	20.19%	10.10%	35.84%	-29.58%	-5.92%	6.26%
Single Stems	0.24%	16.68%	2.09%	16.92%	11.47%	5.74%	28.39%	-17.80%	-3.56%	10.59%
Multi-Stems	98.49%	-31.06%	-3.88%	67.43%	-31.66%	-15.83%	35.77%	47.39%	9.48%	83.16%
Senescent	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Total	100.00%	-	-	100.00%	-	-	100.00%	-	-	100.00%
	16 years (2008)	**Total Difference**	**Difference per year**	**22 years (2002)**	**Total Difference**	**Difference per year**	**30 years (1994)**	**Total Difference**	**Difference per year**	**55 years (1969)**
Seedlings	6.26%	4.21%	0.70%	10.47%	-10.18%	-1.27%	0.29%	-0.29%	-0.01%	0.00%
Single Stems	10.59%	13.25%	2.21%	23.84%	-5.95%	-0.74%	17.89%	-11.92%	-0.48%	5.97%
Multi-Stems	83.16%	-17.85%	-2.98%	65.31%	16.30%	2.04%	81.61%	10.94%	0.44%	92.55%
Senescent	0.00%	0.39%	0.07%	0.39%	-0.18%	-0.02%	0.21%	1.27%	0.05%	1.48%
Total	100.00%	-	-	100.00%	-	-	100.00%	-	-	100.00%

4.5. Kruskal-Wallis Analysis and Wilcoxon Rank Sum Test Tests

Kruskal-Wallis analysis found that there was statistically significant difference between density across the seven fire ages, for each size class and when size classes were combined, with the p-value of all tests <0.05 (Table 8). Due to this finding, post-hoc pairwise Wilcoxon Rank Sum Test tests were conducted for each group to determine which specific fire ages differed from each other. A visual comparison of the data collected for mean density of *Microcorys elatoides* across the seven fire ages for each of the four size classes and when size classes are combined is shown below in Figure 10.

Table 8. Kruskal-Wallis p-values for individual size class density and total density (i.e. size classes combined (GCC))

	Seedlings	Single Stems	Multi-Stems	Senescent	GCC
P-value	<0.001	<0.001	0.0008	<0.001	0.0051

Total plant density (i.e., size classes combined) (mean ± SE) significantly decreased by more than 3,272 plants per ha from 16 years post fire (5,778.33 ± 1007.67) to 30 years post fire (2,505.36 ± 260.64) (x2 = 18.52, d.f. = 6, p = 0.03) (Figure 10). This was predominantly attributed to the significant reduction in seedling density by more than 354 plants per ha from 16 years post fire (361.67 ± 59.55) to 30 years post fire (7.14 ± 4.09) (x2 = 60.97, d.f. = 6, p = 0.00) (Table 9). The significant decrease in total plant density can also be attributed to the significant reduction of single stem plant density by more than 848 and 1,056 plants per ha from 11-years post fire (1,296.67 ± 191.69) to 30- (448.21 ± 73.53) and 55-years post fire (240.39 ± 39.23), respectively (x2 = 34.54, d.f. = 6, p = 0.01 and 0.00).

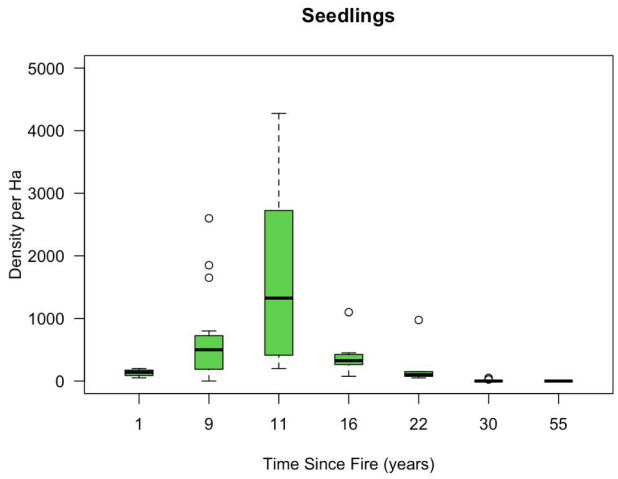
The statistically significant decrease in total plant density does not appear to be majorly impacted by the significant increase in senescent plant density of over 59 plants per ha from nine- (0.00 ± 0.00), 11- (0.00 ± 0.00), and 16-years post fire (0.00 ± 0.00) to 55-years post fire (59.62 ± 24.08) (x2 = 33.14, d.f. = 6, p = 0.01); nor the significant increase in multi-stem plant density by over 3,171 plants per ha from 11-years post fire (1,633.33 ± 223.97) to 16-years post fire (4,805.00 ± 964.55) (x2 = 22.88, d.f. = 6, p = 0.01) (Figure 10) (Table 9).

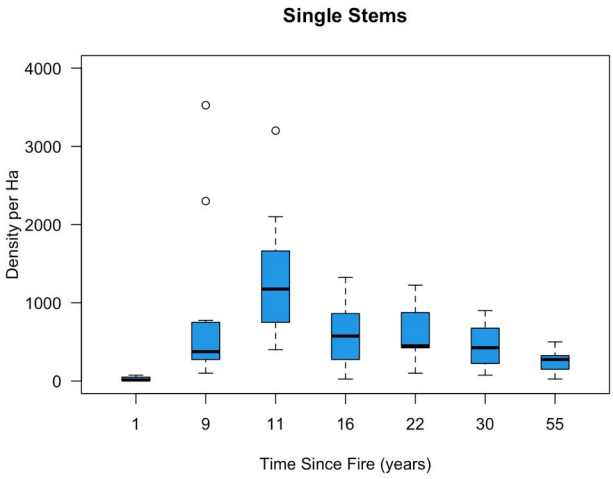
Seedling density also significantly decreased from one- (131.25 ± 31.25), nine- (696.67 ± 195.33), 11- (1,636.67 ± 376.27), and 22-years post fire (270.00 ± 176.71) to 30- (7.14 ± 4.09) and 55-years post fire (0.00 ± 0.00) (x2 = 60.97, d.f. = 6, p = 0.00 to 0.01) (Table 9). Interestingly, seedling density significantly increased by more than 1,505 plants per ha from one year post fire (131.25 ± 31.25) to 11 years post fire (1,636.67 ± 376.27) (x2 = 60.97, d.f. = 6, p = 0.04) (Figure 10).

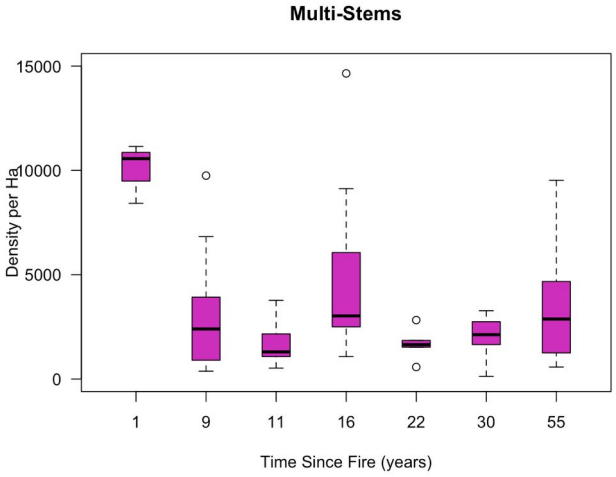
Table 9. Comparison of *Microcorys elatoides* (P1) mean density (plants per ha) ± standard error by size class across fire ages

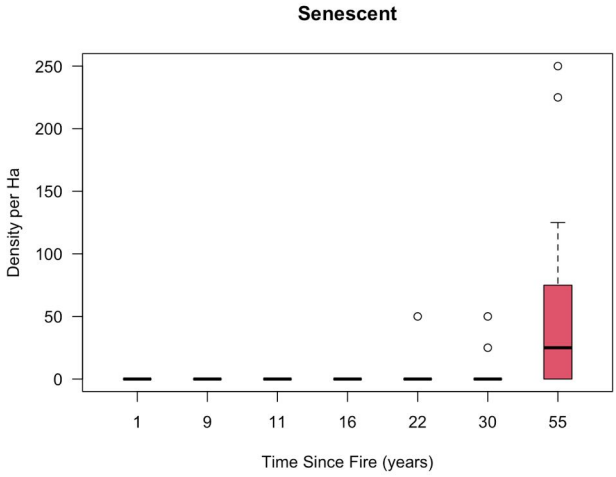
	1 year (2023)	9 years (2015)	11 years (2013)	16 years (2008)	22 years (2002)	30 years (1994)	55 years (1969)
Seedlings	131.25 ±31.25	696.67 ±195.33	1636.67 ±376.27	361.67 ±59.55	270.00 ±176.71	7.14 ±4.09	0.00 ±0.00
Single Stems	25.00 ±17.68	753.33 ±240.95	1296.67 ±191.69	611.67 ±104.85	615.00 ±195.65	448.21 ±73.53	240.39 ±39.23
Multi-Stems	10175.00 ±599.57	3001.67 ±717.43	1633.33 ±223.97	4805.00 ±964.55	1685.00 ±358.93	2044.64 ±221.14	3728.85 ±849.89
Senescent	0.00 ±0.00	0.00 ±0.00	0.00 ±0.00	0.00 ±0.00	10.00 ±9.98	5.36 ±3.87	59.62 ±24.08
GCC	10331.25 ±631.01	4451.67 ±901.96	4566.67 ±690.57	5778.33 ±1007.67	2580.00 ±595.26	2505.36 ±260.64	4028.85 ±869.22

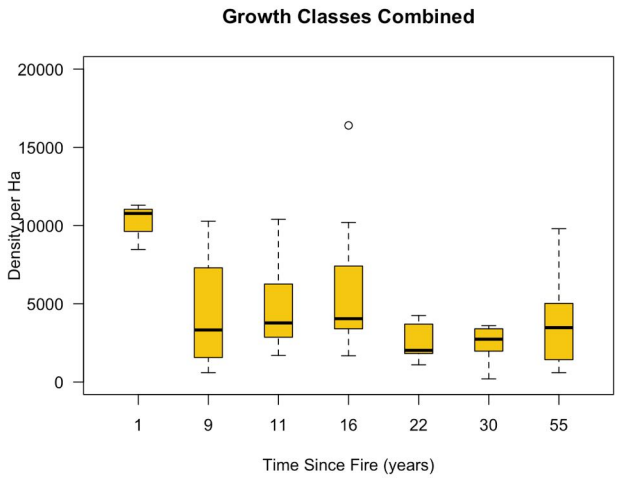
Figure 10. Comparison of *Microcorys elatoides* (P1) size class density distributions and time since fire


Seedlings
Density per Ha
5000
4000
3000
2000
1000
0
1
9
11
16
22
30
55
Time Since Fire (years)


Single Stems
Density per Ha
4000
3000
2000
1000
0
1
9
11
16
22
30
55
Time Since Fire (years)


Multi-Stems
Density per Ha
15000
10000
5000
0
1
9
11
16
22
30
55
Time Since Fire (years)


Senescent
Density per Ha
250
200
150
100
50
0
1
9
11
16
22
30
55
Time Since Fire (years)


Growth Classes Combined
Density per Ha
20000
15000
10000
5000
0
1
9
11
16
22
30
55
Time Since Fire (years)

4.6. Modelling and Trends

Corresponding to the results of the Kruskal-Wallis tests presented above, polynomial regression models for *Microcorys elatoides* density (plants per ha) for each of the four size classes and when size classes combined were completed and are presented in Figure 11. A second-degree polynomial regression (quadratic) was used as the data doesn't demonstrate a need for added complexity of a cubic curve (e.g. a clear inflection point), and the use of high order polynomials ($n > 4$) may lead to over-fitting. The results for each size class and when size classes were combined were consistent with those of the Kruskal-Wallis tests, with the coefficient of at least one order term identified as statistically significant per category (Table 10).

Table 10. Summary of polynomial regression results

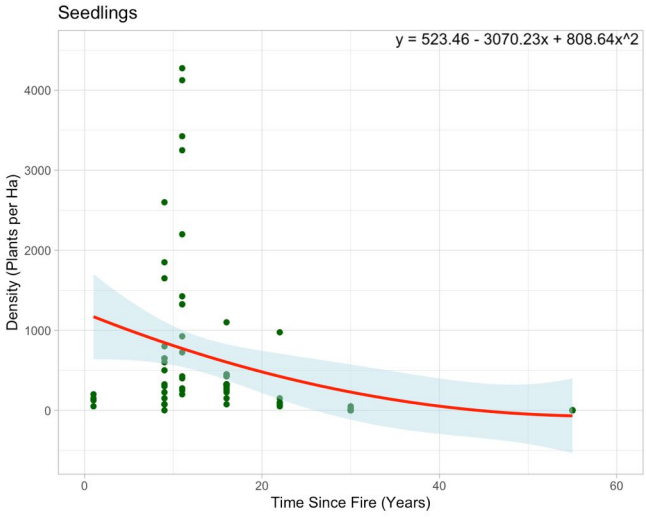
		Estimate	Std. Err.	P-value
Seedlings	Intercept	523.46	94.69	<0.001
$R^2 = 0.1511$	x^1	-3070.23	852.24	0.001
	x^2	808.64	852.24	0.346
Single Stems	Intercept	648.15	70.52	<0.001
$R^2 = 0.1010$	x^1	-1827.26	634.72	0.001
	x^2	-436.39	634.72	0.494
Multi Stems	Intercept	3306.50	321.40	<0.001
$R^2 = 0.1250$	x^1	-2283.60	2892.50	0.432
	x^2	9379.60	2892.50	0.002
Senescent	Intercept	11.11	3.90	0.006
$R^2 = 0.2756$	x^1	177.13	35.08	<0.001
	x^2	71.66	35.08	0.045
Size classes Combined	Intercept	4489.20	337.10	<0.001
$R^2 = 0.1686$	x^1	-7004.00	3033.90	0.024
	x^2	9823.50	3033.90	0.002

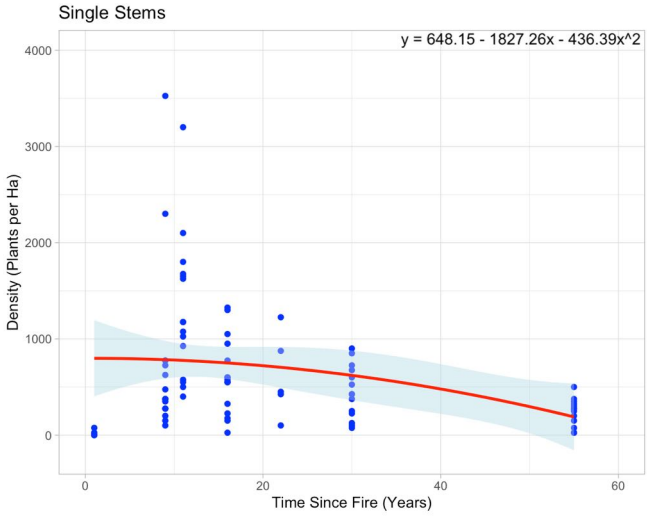
The modelling for total plant density (i.e. size classes combined), indicates there is a statistically significant decrease in plant density at the first order term (-7,004.00 ± 3,033.90, $p = 0.024$), and a statistically significant increase at the second order (9,823.50 ± 3,033.90, $p = 0.002$), with the model explaining 16.86% of the variation in the data (Figure 11) (Table 10). As the change in total density is proportionally greater than the change in fire age at each order, these results suggest there is a significant correlation between the two and that *Microcorys elatoides* (P1) density is relatively sensitive to changes in fire age.

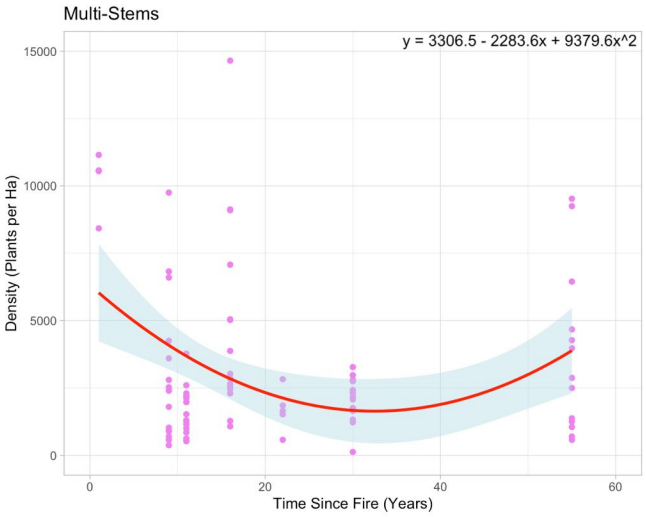
The decrease in total plant density (GCC) at the first order term can be attributed to the significant reduction in seedling (-3,070.23 ± 852.24, $p = 0.001$) and single stem (-1,827.26 ± 634.72, $p = 0.001$) densities. This trend does not appear to be majorly impacted by the statistically significant increase in senescent plant density (177.13 ± 35.08, $p = <0.001$); nor the decrease in multi-stem density at the first order (-2,283.60 ± 2,892.50) as it is not statistically significant ($p = 0.432$) (Figure 11) (Table 10).

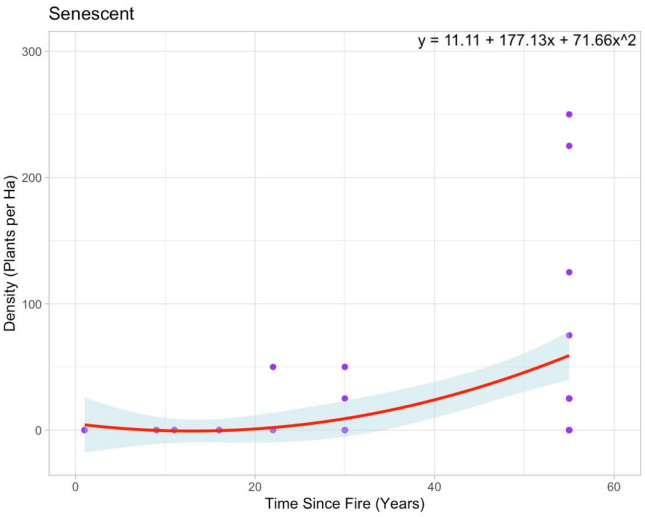
Total plant density increasing at the second order can be predominantly attributed to the significant increase in multi-stem density (9,379.60 ± 2,892.50, $p = 0.002$). The significant increase in senescent plant density at the second order (71.66 ± 35.08, $p = 0.045$) also contributes to this trend but to a lesser extent due to the close proximity of the p-value to the alpha (0.05). The increase in total plant density does not appear to be majorly impacted by the decrease in single stem density (-436.39 ± 634.72, $p = 0.494$); nor the increase in seedling density (808.64 ± 852.24) as it is not statistically significant ($p = 0.346$) (Figure 11) (Table 10).

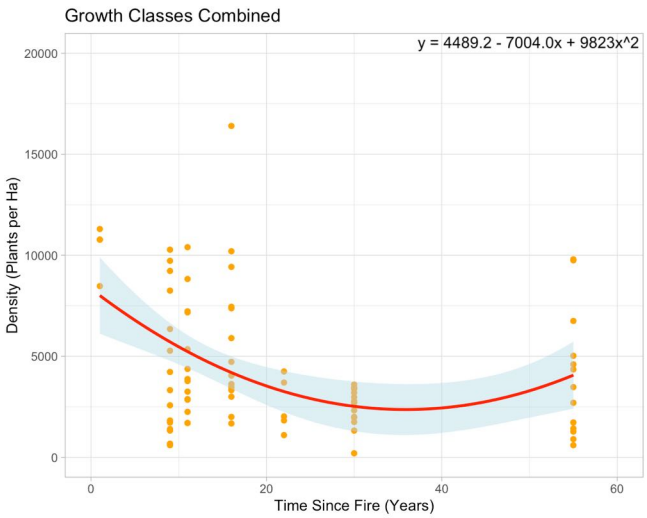
Figure 11. Polynomial regression modelling of the relationship between density of *Microcorys elatoides* (P1) size classes and time since fire


Seedlings
y = 523.46 - 3070.23x + 808.64x^2
Density (Plants per Ha)
Time Since Fire (Years)


Single Stems
y = 648.15 - 1827.26x - 436.39x^2
Density (Plants per Ha)
Time Since Fire (Years)


Multi-Stems
y = 3306.5 - 2283.6x + 9379.6x^2
Density (Plants per Ha)
Time Since Fire (Years)


Senescent
y = 11.11 + 177.13x + 71.66x^2
Density (Plants per Ha)
Time Since Fire (Years)


Growth Classes Combined
y = 4489.2 - 7004.0x + 9823x^2
Density (Plants per Ha)
Time Since Fire (Years)

4.7. Statistics Applied

The percentage change in average distribution of plants per size class per year since a fire event (Table 7) was used to estimate the composition of the *Microcorys elatoides* recorded in each impact area per survey year (Table 11). The results for the estimated composition of impacted *Microcorys elatoides* in 1969 and 2013 burn areas are presented in Table 12 and Table 13, and Table 14 and Table 15, respectively. Across both impact areas, 7,099 plants were recorded in long unburnt vegetation (pre-1969) and have been excluded from the following composition estimates. The date of observation for 208 *Microcorys elatoides* are unknown and have also been excluded from composition estimates (Table 11).

Table 11. Counts of impacted *Microcorys elatoides* within 1969 and 2013 fire affected areas

Survey Year	1969 Burn		2013 Burn	
	Development Envelope	Life of Mine Footprint	Development Envelope	Life of Mine Footprint
2018	356	403	-	-
2019	2,275	2,581	18	4
2020	74	568	85	549
2021	9	1,046	-	14
2022	1	3,428	-	4,735
2023	-	12,006	-	5,752
2024	-	7	-	-
Unknown	66	142	-	-
Total	2,781	20,181	103	11,054

Corresponding to the results of the Kruskal-Wallis tests and regression modelling presented above, seedlings comprised the smallest proportion of *Microcorys elatoides* in 1969 burn affected areas, with an estimated total of at least one plant within the Development Envelope, and at least four plants within the Life of Mine Footprint (Table 12) (Table 13). For both Development Footprints within the 1969 burn area, single stem plants were the second largest size class contributing to *Microcorys elatoides* composition.

It is estimated that for all survey years at least 228 of the 2,715 plants (8.40%) within the Development Envelope, and at least 1,385 of the 20,039 plants (6.91%) within the Life of Mine Footprint were single stem plants.

For the 2013 burn area (1 year since fire), it was found that no senescent plants contributed to the composition of *Microcorys elatoides* (P1) recorded across both impact areas (Table 14, Table 15). In this instance, it is expected that fire would have removed evidence of previously senescent plants.

Seedlings and single stem plants contributed fairly evenly to the composition of *Microcorys elatoides* (P1) records in the 2013 burn areas (11 years since fire). For records within the Development Envelope, it is estimated that 12 (11.75%) of the 103 plants were seedlings, and 12 plants (12.38%) were single stem plants (Table 14). For records within the Life of Mine Footprint, it is estimated that at least 2,990 (20.72%) of the 11,054 plants were seedlings, and at least 2,176 (19.69%) were single stem plants (Table 15). Seedlings and single stem plants comprised a higher proportion of the counts in the Life of Mine Footprint compared to the Development Envelope due to *Microcorys elatoides* recorded after 2020 when the fire age increased from 7 to 10 years.

Low numbers of seedlings and single stem plants in 1969 burn areas (55 years since fire) are not unexpected and indicate that (i) germination of seedlings of *Microcorys elatoides* is not a feature of long unburnt vegetation and (ii) that single stemmed plants soon become multi-stemmed plants as vegetation matures. This fits well with the observation of this species being a fire responsive geosporous species where seeds are stimulated to germinate following fire.

4.7.1. Applying the Regression Analysis to remove seedlings and young single-stemmed plants from the Impact Assessment

- Using the raw data gathered in targeted surveys for *Microcorys elatoides* within the MP121883 Development Footprint and Life of Mine Footprint, 41,218 plants will be impacted by development of the EGLP. This represents 11.31% of the known population.

- Subtracting the estimated 3,009 seedlings calculated as likely occurring in the 1969 and 2013 burn areas and within the MP121883 Development Footprint and Life of Mine footprint results in the number of reproductively mature *Microcorys elatoides* impacted being revised downwards to 38,209 plants, representing 10.48% of the known population.

- Subtracting the estimated 3,803 young, single-stemmed plants calculated as likely occurring in the 1969 and 2013 burn areas and within the MP121883 Development footprint and Life of Mine footprint, the projected impact of the Mount Holland Project on *Microcorys elatoides* will be further revised downwards to 34,406 plants, representing 9.44% of the known population.

Table 12. Estimated population composition of *Microcorys elatoides* (P1) within the 1969 burn area of the Development Envelope

Survey Year Time Post Fire	2018 49 yr P.F.	2019 50 yr P.F.	2020 51 yr P.F.	2021 52 yr P.F.	2022 53 yr P.F.	Total
Seedlings	0.25 (0.07%)	1.32 (0.06%)	0.03 (0.05%)	0.00 (0.03%)	0.00 (0.02%)	1.6 (0.06%)
Single Stems	31.44 (8.83%)	190.05 (8.35%)	5.83 (7.88%)	0.67 (7.40%)	0.07 (6.92%)	228.06 (8.40%)
Multi-Stems	320.13 (89.92%)	2,055.74 (90.36%)	67.19 (90.8%)	8.21 (91.24%)	0.92 (91.67%)	2,452.19 (90.32%)
Senescent	4.18 (1.18%)	27.89 (1.23%)	0.94 (1.28%)	0.12 (1.33%)	0.01 (1.38%)	33.14 (1.22%)
Total	356 (100%)	2,275 (100%)	74 (100%)	9 (100%)	1 (100%)	2,715 (100%)

Table 13. Estimated population composition of *Microcorys elatoides* (P1) within the 1969 burn area of the Life of Mine Footprint

Survey Year Time Post Fire	2018 49 yr P.F.	2019 50 yr P.F.	2020 51 yr P.F.	2021 52 yr P.F.	2022 53 yr P.F.	2023 54 yr P.F.	2024 55 yr P.F.	Total
Seedlings	0.28 (0.07%)	1.50 (0.06%)	0.26 (0.05%)	0.36 (0.03%)	0.80 (0.02%)	1.39 (0.01%)	0.00 (0.00%)	4.59 (0.02%)
Single Stems	35.59 (8.83%)	215.62 (8.35%)	44.74 (7.88%)	77.41 (7.40%)	237.34 (6.92%)	774.00 (6.45%)	0.42 (5.97%)	1,385.12 (6.91%)
Multi-Stems	362.40 (89.92%)	2,332.24 (90.36%)	515.74 (90.8%)	954.34 (91.24%)	3,142.61 (91.67%)	11,059.01 (92.11%)	6.48 (92.55%)	18,372.82 (91.69%)
Senescent	4.74 (1.18%)	31.64 (1.23%)	7.25 (1.28%)	13.89 (1.33%)	47.25 (1.38%)	171.59 (1.43%)	0.10 (1.48%)	276.46 (1.38%)
Total	403 (100%)	2,581 (100%)	568 (100%)	1,046 (100%)	3,428 (100%)	12,006 (100%)	7 (100%)	20,039 (100%)

Table 14. Estimated population composition of *Microcorys elatoides* (P1) within the 2013 burn area of the Development Envelope

Survey Year Time Post Fire	2019 6 yr P.F.	2020 7 yr P.F.	Total
Seedlings	1.85 (10.26%)	10.25 (12.06%)	12.10 (11.75%)
Single Stems	1.92 (10.67%)	10.84 (12.75%)	12.76 (12.38%)
Multi-Stems	14.23 (79.08%)	63.92 (75.20%)	78.15 (75.87%)
Senescent	0.00 (0.00%)	0.00 (0.00%)	0.00 (0%)
Total	18 (100%)	85 (100%)	103 (100%)

Table 15. Estimated population composition of *Microcorys elatoides* (P1) within the 2013 burn area of the Life of Mine Footprint

Survey Year Time Post Fire	2019 6 yr P.F.	2020 7 yr P.F.	2021 8 yr P.F.	2022 9 yr P.F.	2023 10 yr P.F.	Total
Seedlings	0.41 (10.26%)	66.18 (12.06%)	1.94 (13.85%)	741.03 (15.65%)	1,480.85 (25.75%)	2,990.41 (20.72%)
Single Stems	0.43 (10.67%)	70.00 (12.75%)	2.08 (14.84%)	801.16 (16.92%)	1,303.12 (22.66%)	2,176.65 (19.69%)
Multi-Stems	3.16 (79.08%)	412.82 (75.20%)	9.98 (71.31%)	3,192.81 (67.43%)	2,968.03 (51.60%)	6,586.80 (59.59%)
Senescent	0.00 (0.00%)	0.00 (0.00%)	0.00 (0.00%)	0.00 (0.00%)	0.00 (0.00%)	0.00 (0%)
Total	4 (100%)	549 (100%)	14 (100%)	4,735 (100%)	5,752 (100%)	11,054 (100%)

5. Factors Affecting Results of this Demographic Assessment

- As deceased plants were not recorded, mortality data is not available.

- It would be useful to correlate *Microcorys elatoides* population densities with physical parameters such as soil type and landscape position to determine if there are differences in population composition related to these physical features. These features may also define vegetation associations at sites. Investigation into these factors could provide a more in-depth and robust demography study with stronger conclusions able to be drawn. For example, quadrat Q2002_05ME recording of vegetation type and other site data would assist in delineating why this quadrat is a strong outlier.

- In any future demographic assessment, Carl Cosper (Program leader for Plant Science and Herbarium Program at DBCA) recommended collecting flower and fruiting data (Pers. Comms., R. Rees (DBCA)). Data on flowering and fruiting data (scale of absent, present, low quantity, or high quantity – relative to plant size) is required to estimate the juvenile period, number of reproductive stages in the lifecycle of *Microcorys elatoides* (P1), size at which reproductive maturity is reached, and gain recruitment data.

- The following quadrats were exposed to more frequent fires since 1969 than other quadrats: all 2002 quadrats were burnt in 1969; 2015 quadrats 1 to 5 were burnt in 1969 and 1994; 2015 quadrats 7 and 9 were burnt in 1994; and all 2023 quadrats were burnt in 2015. Comparatively increased fire frequency for these quadrats may impact *Microcorys elatoides* (P1) counts and size class distributions, particularly if time between fires is less than that required for the vegetation to return to pre-burn conditions (five to ten years).

- Q2023_01ME was scored shortly after a recent fire and before a recruitment event for seedling and single stem plant recruitment had occurred. As such this quadrat could not be used in statistical analyses. However, it is representative of what happens after a fire event, before a recruitment event occurs, compared to the other 2023 quadrats that reflect the impact of a recruitment event.

- Ten more 2002 burn quadrats north-east of the Mount Holland Project in Jilbadji Nature Reserve were scheduled to be scored. However, access was prevented by deep boggy wet clay soils that were inundated with water on both potential access tracks. Multiple attempts throughout the survey period were made, with the tracks remaining impassable due to winter and summer rainfalls.

5.1. Extent of Occurrence and Area of Occupancy as a Measure of Impacts to *Microcorys elatoides*

The Extent of Occurrence (EOO)) of *Microcorys elatoides*, inclusive of all known populations of the species, is calculated as 109,543 ha extending from south and east of the EGLP minesite, northwards to the Jilbadji Nature Reserve and westwards to a population on King Ingram Road.

Within the EOO polygon, the Area of Occupancy (AOO), is calculated as 331.17 ha, representing 0.30% of the EOO. The AOO assumed a 5m radius around any given data point recorded in surveys for *Microcorys elatoides*.

Of the 331.17 ha AOO occupied by *Microcorys elatoides* known as at March 2025, 13.60 ha lies within the proposed MP121883 mine footprint and 30.50 ha lies within the proposed LOM footprint. These represent 4.11% and 9.07% respectively of the overall known population to date. Outside the proposed mine areas, 43.62 ha remains within the Jilbadji Nature Reserve and 243.90 ha remains outside this within Unallocated Crown Land (UCL).

	Conserved		**To Be Taken**	
Area of Occupancy of *Microcorys elatoides* proposed to be taken in MP121883 and LOM footprints	**Area (ha)**	**%**	**Area (ha)**	**%**
Microcorys elatoides in the MP121883 mine footprint			13.60	4.11%
Microcorys elatoides in the LOM footprint			30.05	9.07%
Total of *Microcorys elatoides* within mine footprint and LOM			43.65	13.18%
Microcorys elatoides within Jilbadji NR	43.62	13.17%		
Microcorys elatoides outside the LOM footprint (and not in the Jilbadji NR), within UCL	243.90	73.65%		
Total of *Microcorys elatoides* remaining outside mine footprint and LOM	287.52	86.82%		

6. Limitations

Limitation	Discussion
Available sources of contextual information	• *Microcorys elatoides* is well known to all staff involved in assessments on ground and identification of the species in the field was accurate. • Information on fire regimes of the region were accessed from publicly available data. This is not a Limitation for the works reported
The Scope of the survey	• The assessment was Scoped appropriately as a Demographic Study. This is not a Limitation for the works reported
Proportion of flora collected and identified	• Experienced senior botanists lead teams in the field at all times. • *Microcorys elatoides* is well known to all staff involved in assessments on ground and identification of the species in the field was accurate. • A great deal of care was taken to distinguish *Microcorys elatoide*s from any other similar species, notably *Eremophila ionantha*, which can be mistaken for the species but which differs in leaf arrangement and morphology. This is not a Limitation for the works reported
Completeness and further work which may be needed	• Sufficient replication of quadrats was undertaken in the field to allow analysis. Anomalous or potentially erroneous data was omitted from the analyses. This is not a Limitation for the works reported
Mapping reliability	• Mapping was conducted utilising iPads running ARCGIS FieldMaps application with high resolution satellite imagery base maps and GPS accuracy of between +/- 2.5m to 3.5m regularly achieved. This is not a Limitation for the works reported
Timing: weather, season	• Climatic and weather conditions were entirely favourable during the field operations. This is not a Limitation for the works reported
Disturbances	• The Demographic Study was aimed at recording the proportions of seedlings, juveniles and mature plants within

Limitation	Discussion
	differing fire-age regimes. Numerous fire age regimes were available within the area supporting *Microcorys elatoides* and the presence of these was useful in gauging population dynamics over time since fire. This is not a Limitation for the works reported
Intensity	• Sufficient sampling was undertaken in the field for the purposes of analysis. • Quadrat assessment was undertaken very carefully with two to three operators within a 10 x 10m quadrat, collecting data. This is not a Limitation for the works reported.
Resources	• Adequate resources and funds were made available by Covalent to address the agreed Scope at all times. This is not a Limitation for the proposal
Access	• Access to the Study Area was excellent in all areas. This is not a Limitation for the proposal
Experience levels	• The team developed and utilised for this project undertook the works in a systematic fashion and was led at all times by at least one senior botanist per team. • All staff involved were very familiar with a range of significant flora of the Mt Holland area and had between 2 and 5 years' experience with the flora of the region. This is not a Limitation for the proposal

7. List of Participants

Staff Member	Field Surveys	Data Analysis	Report Preparation
Felicity Keet B.Sc (Agricultural Science and Conservation Biology) License No. – FB62000530 and FT61001601	**1**	**1**	**1**
Geoff Cockerton B.Sc. (Biology) License No. – FB62000542 Report review			**1**
Jason Paterson License No. – FB62000643		**1**	**1**
Douglas Lievense Field Team Leader License No. – FB62000755	**1**		
Natacha Issler Field team member	**1**		
Gemma Grigg Field team member License No. – FB62000493	**1**		

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Appendix 1. Quadrat Location Data

Quadrat #	Fire Year	Latitude	Longitude
Q1969_01ME*	1969*	-32.08789971*	119.7661986*
Q1969_02ME	1969	-32.08994405	119.7574624
Q1969_03ME	1969	-32.08993165	119.7586671
Q1969_04ME	1969	-32.08823482	119.7636654
Q1969_05ME	1969	-32.09004724	119.7606479
Q1969_06ME	1969	-32.08505894	119.7681895
Q1969_07ME*	1969*	-32.08704274*	119.7669031*
Q1969_08ME	1969	-32.08122957	119.7222343
Q1969_09ME	1969	-32.08136720	119.7228737
Q1969_10ME	1969	-32.07477326	119.7300188
Q1969_11ME	1969	-32.07429178	119.7311935
Q1969_12ME	1969	-32.07364352	119.7300314
Q1969_13ME	1969	-32.07436774	119.7306992
Q1969_14ME	1969	-32.05823772	119.7273623
Q1969_15ME	1969	-32.05816248	119.7280453
Q1994_01ME	1994	-32.13360000	119.6197700
Q1994_02ME	1994	-32.13313000	199.6194400
Q1994_03ME	1994	-32.13325000	119.6208600
Q1994_04ME	1994	-32.13278000	119.6209000
Q1994_05ME	1994	-32.13291000	119.6182100
Q1994_06ME*	1994*	-32.22344567*	119.6538970*
Q1994_07ME	1994	-32.22140330	119.6529084

Quadrat #	Fire Year	Latitude	Longitude
Q1994_08ME	1994	-32.22048900	119.6528430
Q1994_09ME	1994	-32.22355012	119.6557273
Q1994_10ME	1994	-32.22271122	119.6534951
Q1994_11ME	1994	-32.11696942	119.6491699
Q1994_12ME	1994	-32.11676553	119.6499292
Q1994_13ME	1994	-32.11654558	119.6505101
Q1994_14ME	1994	-32.11612660	119.6496394
Q1994_15ME	1994	-32.11548137	119.6496885
Q2002_01ME	2002	-32.01250131	119.5761086
Q2002_02ME	2002	-32.01197400	119.5763596
Q2002_03ME	2002	-32.01201805	119.5749564
Q2002_04ME	2002	-32.01150520	119.5749389
Q2002_05ME	2002	-32.01185577	119.5746996
Q2008_01ME	2008	-32.03351000	119.7536000
Q2008_02ME	2008	-32.03432000	119.7537700
Q2008_03ME	2008	-32.03466000	119.7547500
Q2008_04ME	2008	-32.03438000	119.7561300
Q2008_05ME	2008	-32.03377000	119.7549100
Q2008_06ME	2008	-32.01969374	119.7388100
Q2008_07ME	2008	-32.01959563	119.7394410
Q2008_08ME	2008	-32.02139965	119.7408089
Q2008_09ME	2008	-32.02419830	119.7412243
Q2008_10ME	2008	-32.02387453	119.7407046

Quadrat #	Fire Year	Latitude	Longitude
Q2008_11ME	2008	-32.01216214	19.75319111
Q2008_12ME	2008	-32.01120828	119.7541331
Q2008_13ME	2008	-32.01086508	119.7529799
Q2008_14ME	2008	-32.00983335	119.7551956
Q2008_15ME	2008	-32.01149872	119.7545006
Q2013_01ME	2013	-32.06304000	119.7642600
Q2013_02ME	2013	-32.06325000	119.7656000
Q2013_03ME	2013	-32.06393000	119.7649300
Q2013_04ME	2013	-32.06481000	119.7653800
Q2013_05ME	2013	-32.06588000	119.7653100
Q2013_06ME	2013	-32.06385831	119.7706232
Q2013_07ME	2013	-32.06253355	119.7698914
Q2013_08ME	2013	-32.06281325	119.7704096
Q2013_09ME	2013	-32.06293280	119.7708161
Q2013_10ME	2013	-32.06343946	119.7690702
Q2013_11ME	2013	-32.12800140	119.7557701
Q2013_12ME	2013	-32.12877685	119.7544698
Q2013_13ME	2013	-32.12684152	119.7528373
Q2013_14ME	2013	-32.12730301	119.7532461
Q2013_15ME	2013	-32.12755052	119.7555520
Q2015_01ME	2015	-32.16459903	119.7162340
Q2015_02ME	2015	-32.16398342	119.7159594
Q2015_03ME	2015	-32.16387860	119.7164533

Quadrat #	Fire Year	Latitude	Longitude
Q2015_04ME	2015	-32.16289000	119.7166954
Q2015_05ME	2015	-32.16250281	119.7162362
Q2015_06ME	2015	-32.16401719	119.7317484
Q2015_07ME	2015	-32.16528417	119.7307127
Q2015_08ME	2015	-32.16502249	119.7296710
Q2015_09ME	2015	-32.16389706	119.7299430
Q2015_10ME	2015	-32.16384742	119.7305625
Q2015_11ME	2015	-32.18489015	119.7764561
Q2015_12ME	2015	-32.18514156	119.7731098
Q2015_13ME	2015	-32.18562953	119.7739338
Q2015_14ME	2015	-32.18623388	119.7744813
Q2015_15ME	2015	-32.17427000	119.7448195
Q2023_01ME*	2023*	-32.16482991*	119.7154091*
Q2023_02ME	2023	-32.16487307	119.71569028
Q2023_03ME	2023	-32.16505792	119.71577751
Q2023_04ME	2023	-32.16506193	119.71597289
Q2023_05ME	2023	-32.16500530	119.71535790

* Excluded from data analysis

Appendix 2. Raw Quadrat Data

Quadrat #	Fire Year	Seedlings	Single Stems	Multi-Stems	Senescent	Total
Q1969_01ME *	1969	4	2	28	0	34
Q1969_02ME	1969	0	3	28	5	36
Q1969_03ME	1969	0	10	50	9	69
Q1969_04ME	1969	0	6	42	3	51
Q1969_05ME	1969	0	14	115	10	139
Q1969_06ME	1969	0	1	55	1	57
Q1969_07ME *	1969	0	2	9	5	16
Q1969_08ME	1969	0	15	159	0	174
Q1969_09ME	1969	0	20	370	0	390
Q1969_10ME	1969	0	12	171	1	184
Q1969_11ME	1969	0	11	381	0	392
Q1969_12ME	1969	0	13	187	1	201
Q1969_13ME	1969	0	11	258	1	270
Q1969_14ME	1969	0	8	100	0	108
Q1969_15ME	1969	0	1	23	0	24
Q1994_01ME	1994	0	24	112	0	136
Q1994_02ME	1994	0	5	131	0	136
Q1994_03ME	1994	0	3	5	0	8
Q1994_04ME	1994	0	36	83	0	119
Q1994_05ME	1994	0	34	110	0	144
Q1994_06ME *	1994	1	58	260	0	319

Quadrat #	Fire Year	Seedlings	Single Stems	Multi-Stems	Senescent	Total
Q1994_07ME	1994	0	27	66	0	93
Q1994_08ME	1994	2	17	119	0	138
Q1994_09ME	1994	1	29	97	1	128
Q1994_10ME	1994	1	15	93	2	111
Q1994_11ME	1994	0	9	70	0	79
Q1994_12ME	1994	0	4	49	0	53
Q1994_13ME	1994	0	10	70	0	80
Q1994_14ME	1994	0	21	87	0	108
Q1994_15ME	1994	0	17	53	0	70
Q2002_01ME	2002	3	4	66	0	73
Q2002_02ME	2002	6	49	113	2	170
Q2002_03ME	2002	2	18	61	0	81
Q2002_04ME	2002	4	17	23	0	44
Q2002_05ME	2002	39	35	74	0	148
Q2008_01ME	2008	17	53	586	0	656
Q2008_02ME	2008	10	38	114	0	162
Q2008_03ME	2008	13	31	364	0	408
Q2008_04ME	2008	17	24	121	0	162
Q2008_05ME	2008	44	52	202	0	298
Q2008_06ME	2008	9	7	51	0	67
Q2008_07ME	2008	13	1	106	0	120
Q2008_08ME	2008	6	6	283	0	295

Quadrat #	Fire Year	Seedlings	Single Stems	Multi-Stems	Senescent	Total
Q2008_09ME	2008	3	9	365	0	377
Q2008_10ME	2008	18	23	98	0	139
Q2008_11ME	2008	13	24	43	0	80
Q2008_12ME	2008	18	13	102	0	133
Q2008_13ME	2008	13	22	201	0	236
Q2008_14ME	2008	12	22	155	0	189
Q2008_15ME	2008	11	42	92	0	145
Q2013_01ME	2013	88	41	85	0	214
Q2013_02ME	2013	165	84	104	0	353
Q2013_03ME	2013	171	66	52	0	289
Q2013_04ME	2013	53	16	21	0	90
Q2013_05ME	2013	130	65	92	0	287
Q2013_06ME	2013	37	72	46	0	155
Q2013_07ME	2013	53	37	25	0	115
Q2013_08ME	2013	137	128	151	0	416
Q2013_09ME	2013	57	22	51	0	130
Q2013_10ME	2013	11	23	34	0	68
Q2013_11ME	2013	10	43	61	0	114
Q2013_12ME	2013	16	47	88	0	151
Q2013_13ME	2013	29	67	79	0	175
Q2013_14ME	2013	17	47	51	0	115
Q2013_15ME	2013	8	20	40	0	68

Quadrat #	Fire Year	Seedlings	Single Stems	Multi-Stems	Senescent	Total
Q2015_01ME	2015	24	8	101	0	133
Q2015_02ME	2015	74	31	264	0	369
Q2015_03ME	2015	32	25	112	0	169
Q2015_04ME	2015	66	92	96	0	254
Q2015_05ME	2015	104	141	144	0	389
Q2015_06ME	2015	3	6	15	0	24
Q2015_07ME	2015	0	4	23	0	27
Q2015_08ME	2015	20	11	72	0	103
Q2015_09ME	2015	13	15	28	0	56
Q2015_10ME	2015	26	11	36	0	73
Q2015_11ME	2015	3	14	36	0	53
Q2015_12ME	2015	12	29	170	0	211
Q2015_13ME	2015	9	19	41	0	69
Q2015_14ME	2015	6	15	390	0	411
Q2015_15ME	2015	26	31	273	0	330
Q2023_01ME *	2023	0	0	522	0	522
Q2023_02ME	2023	6	0	446	0	452
Q2023_03ME	2023	5	3	423	0	431
Q2023_04ME	2023	8	1	422	0	431
Q2023_05ME	2023	2	0	337	0	339

* Excluded from data analysis\

Appendix 3. Representative Quadrat Photos

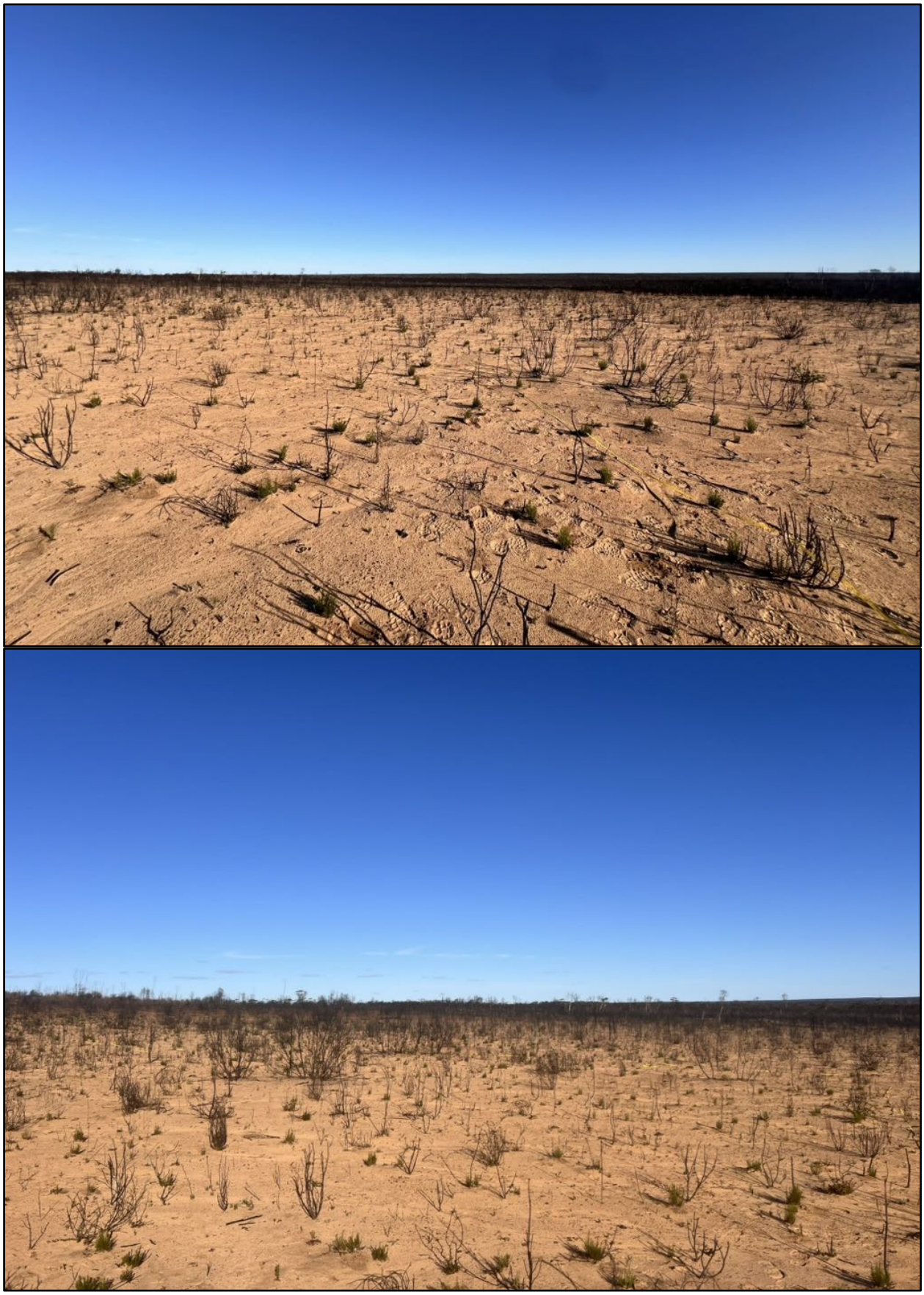

Plate 4. 2023 burn quadrat six months post fire (Q2023_01ME)

Plate 5. 2023 burn quadrat one year post fire (quadrat number unknown)

Plate 6. 2013 burn quadrat within the Life of Mine (quadrat number unknown)

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