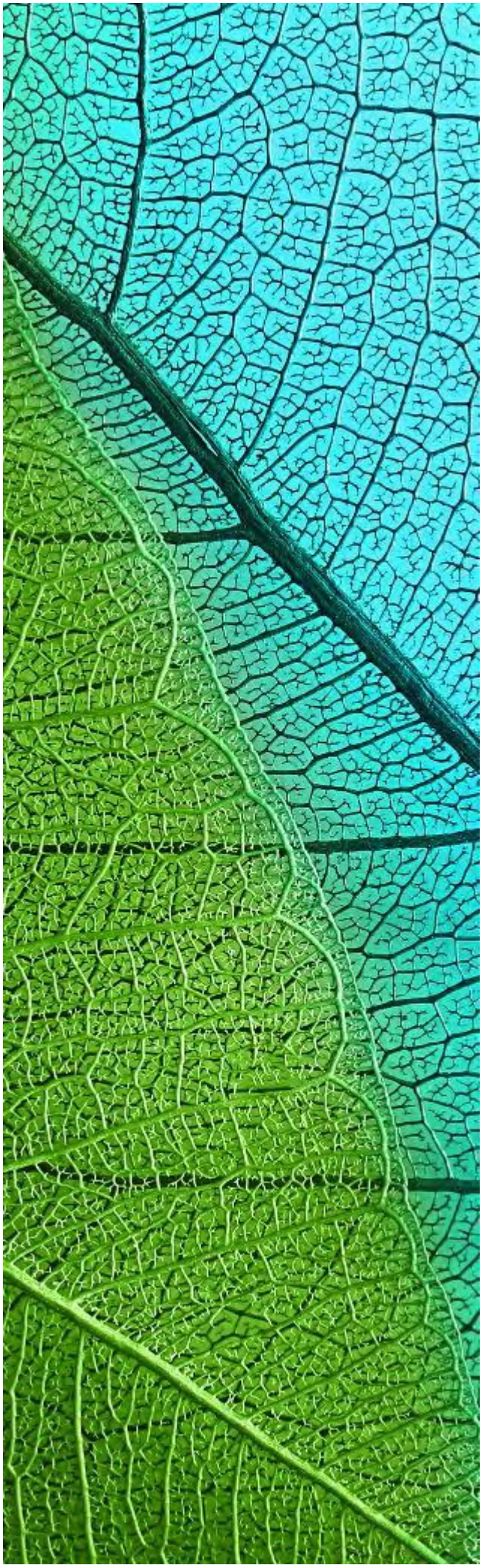

Modeina Estate Precinct 2 (EPBC 2011/6063)

Compliance Report – Year 6

Prepared for DFC (Project Management) Pty Ltd

December 2023
Report No. 7045.68 (1.0)

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1. Introduction

This Compliance Report addresses the conditions of approval 2011/6063 under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) held by the approval holder – DFC (Project Management) Pty Ltd ('DFC') – for the Modeina Precinct 2 residential development. The Approval was dated 25th July 2015; a Consolidated Variation Notice was issued by the Department of the Environment and Energy on 9th November 2018. This Compliance Report refers to this current Notice and is referred to herein as the 'Approval'.

Construction activities commenced within Precinct 2 as defined in Appendix 1 of the approval on 9th October 2018. To date, construction activities are completed in Project Areas A1 and B, while ongoing in A2 and C2, with commencement in D as of 16th September 2022. This report provides evidence of compliance with the conditions of the approval relevant to these two project areas, in particular:

- Condition 1 – construction activities contained to the overall project area;
- Condition 2 – the implementation of sediment and erosion control measures during construction activities;
- Conditions 3 & 4 – Growling Grass Frog Management Plan;
- Condition 5 – no more than eleven (11) Spiny Rice-flower impacted in Project Areas A1 and A2;
- Condition 6 – offsets secured and offset management implemented for Project Area A1;
- Condition 6A – offsets for impacts associated with Project Area A2;
- Conditions 7 & 8 – offsets secured and offset management implemented for Project Area B;
- Conditions 13, 14, 16 & 17 – construction activities not undertaken in Project Areas C1, C2 & D and the Grassland Reserve;
- Condition 14A – Grassland Reserve Management Plan;
- Condition 18 – offset shapefiles and attributes provided to the Department;
- Condition 19 – advising the Minister within 30 days of commencement of construction;
- Condition 21 – preparation of this Compliance Report; and
- Condition 26 – approved management plans published on the approval holder's website within 1 month of approval.

This compliance report draws together information from the following sources:

- Reporting, correspondence and mapping files compiled by Nature Advisory (formerly Brett Lane and Associates (BL&A)) on behalf of DFC (Project Management) Pty Ltd;
- Grassland Reserve monitoring undertaken on 23rd May 2023 and onsite compliance monitoring undertaken on 23rd October 2023 by botanists from Nature Advisory;
- Weed management reporting provided by Australian Ecosystems; and
- Offset landowner monitoring reports.

This report was prepared by a team from Nature Advisory comprising Cody Hajnal (Botanist), Suzie Moss (Botanist), Neassa Fritchley (Botanist) and Merinda Day-Smith (Senior Botanist and Project Manager) with additional information supplied by the approval holder. Sources of information and observations are indicated throughout.

2. Onsite monitoring

2.1. Compliance monitoring – October 2023

An onsite compliance monitoring inspection was conducted on 23rd October 2023. During this assessment, all areas of Precinct 2 were inspected on foot, including the interfaces of areas currently undergoing construction works with surrounding land currently protected as 'No Go' areas and the Growling Grass Frog Management Buffer. Prior to this assessment, monitoring of the Grassland Reserve was conducted on 23rd May 2023.

Information relevant to the conditions of the approval was gathered throughout Precinct 2 to supplement information provided by the approval holder. This included information on the following:

- Precinct 2 development area:
    - The presence of 'No Go' fencing and sediment/erosion control measures on the boundaries between construction areas and 'No Go' areas;
    - The extent of noxious and high threat weeds and evidence of weed control;
- Grassland Reserve:
    - Weed cover estimates for each weed species;
    - Overall weed cover estimate;
    - Information on the status and health of Spiny Rice-flower plants;
    - Assessment of biomass;
    - Monitoring of evidence of pest animals; and
    - Assessment of the integrity of fencing around the perimeter of the reserve;
- Growling Grass Frog Management Buffer:
    - Evidence of personnel briefing;
    - Overall weed cover estimate and evidence of weed control;
    - Evidence of the removal of pest animal harbour; and
    - Status of any seeding/revegetation works.

2.2. Growling Grass Frog monitoring

Pre-construction Growling Grass Frog population and habitat monitoring commenced in January 2017 during the November 2016–February 2017 breeding season. A further five annual breeding season population and habitat monitoring events were undertaken in November 2017 (one month following commencement of construction (Year 1), December 2018/January 2019 (Year 2), November 2019 (Year 3), November 2020 (Year 4), December 2021 (Year 5),December 2022 (Year 6) and December 2023 (Year 7).

A summary of the monitoring methods and outcomes is provided in Section 3.2.

3. Compliance with approval conditions

The Approval conditions relate to the protection of the following Matters of National Environmental Significance (MNES) listed under the EPBC Act and located across six project areas within the precinct – Project Areas A1, A2, B, C1, C2 & D:

- The grassland ecological community *Natural Temperate Grassland of the Victorian Volcanic Plain* (NTGVVP) – located in discreet patches across the precinct;
- Striped Legless Lizard (*Delma impar*) habitat – coinciding with all areas of mapped NTGVVP; and
- Spiny Rice-flower (*Pimelea spinescens* subsp. *Spinescens*) plants.

The definitions from the Approval that apply to the terms shown in bold throughout this document are listed in Appendix 1 of this report.

3.1. Conditions 1 and 2 – construction activities

Conditions 1 and 2 of the Approval read as follows:

1. The **approval holder** must ensure that **construction activities** do not occur outside of the **project area** as illustrated at Appendix 1.

2. The **approval holder** must implement sediment and erosion control measures consistent with **best practice pollution, sediment and erosion control guideline(s)** for the duration of **construction activities**.

Condition 1 compliance

Construction activities were underway at the time of the Year 4 (October 2021) assessment, with a combination of temporary construction fencing and post-and-wire fencing installed around areas of Project Areas A1, A2 and C2 where works were occurring.

During the Year 5 (October 2022) assessment, construction was occurring in Project Areas A2, C2 and D. Appropriate construction and post-and-wire fencing were in place, in good condition and kept closed to prevent activities occurring outside the Project Area.

At the time of the current Year 6 (October 2023) assessment, construction was occurring in Project Areas A2, C1, C2 and D. Temporary construction and post-and-wire fencing were in place and generally in good condition. Some areas of temporary construction fencing had openings that need to be closed to prevent activities occurring outside the Project Area. These areas were address following the survey.

Condition 2 compliance

Prior to continued construction, sediment fencing is required to be installed between construction zones and the Kororoit Creek environs and retained native vegetation.

At the time of the Year 4 (October 2021) assessment, suitable sediment fencing was in place to protect the Grassland Reserve and wherever construction was occurring. No stockpiles, machinery/equipment laydown or washdown areas were observed within the Growling Grass Frog Management Buffer.

At the time of the Year 5 (October 2022) assessment, sediment fencing was mostly appropriately placed and in good condition. No stockpiles, machinery/equipment laydown or washdown areas were observed within the Growling Grass Frog Management Buffer.

Flooding of the creek line had left some of the sediment fencing in a state of disrepair in areas where revegetation work had commenced; this was rectified, however, the location of sediment fencing here is not achieving any practical purpose now that the jute matting has been laid, therefore it should be removed.

Sediment fencing and trapped sediment remaining in place since earlier construction works, and therefore no longer required, should be removed before it deteriorates to the point where the trapped sediment breaches the fabric barrier and washes into Kororoit Creek, as well as becoming plastic litter.

At the time of the current Year 6 (October 2023) assessment, the majority of sediment fencing observed was in poor condition. Sediment fencing was repaired in areas following the survey. Ongoing weekly inspection will be implemented to ensure sediment fencing remains effective. No stockpiles, machinery/equipment laydown or washdown areas were observed within the Growling Grass Frog Management Buffer.

3.2. Conditions 3 and 4 – Growling Grass Frog Management Plan

Conditions 3 and 4 of the Approval read as follows:

3. The **approval holder** must prepare a site-specific **Growling Grass Frog** Management Plan; which is required to be consistent with **best practice Growling Grass Frog management guidelines**. The plan must outline how significant impacts to **Growling Grass Frogs** will be avoided or mitigated and as a minimum must include:
    a. Management measures demonstrating how the **Growling Grass Frog buffer zone** will be demarcated to minimise vehicle access;
    b. Details of revegetation, **environmental weed** control measures and other management activities within the **Growling Grass Frog buffer zone**;
    c. Details of any **construction activities** and management measures to avoid **significant impacts** during construction; and
    d. Measures to ensure any on-site personnel will be informed of their obligations under the **Growling Grass Frog** Management Plan.

4. **Construction activities** must not commence in **Project Areas A1, A2, C1, C2** and **D** until the site specific **Growling Grass Frog** Management Plan has been approved by the **Minister** in writing. Construction in **Project Area B** can proceed prior to approval of the site-specific **Growling Grass Frog** Management Plan. The site specific **Growling Grass Frog** Management Plan must be implemented.

Conditions 3 and 4 compliance

BL&A Report 7045 (29.7) *Growling Grass Frog Management Plan* (GGFMP) was approved by the Minister in writing on 20th September 2017 and is available for viewing on the proponent's website at https://www.denniscorp.com.au/about-dennis-family/initiatives-and-awards/sustainability/. Of the project areas listed above, construction commenced in Project Area A1 (only) on 9th October 2017.

This compliance reporting is made against the construction phase management and monitoring actions for the Growling Grass Frog Management Buffer (GGFMB) outlined in Tables 6 and 7 of the GGFMP. These actions and the relevant section of the GGFMP are listed below under the four core requirements of the Plan outlined in Condition 3:

- Demarcation of GGFMB – Condition 3a:
    - Staged construction and temporary access restrictions (GGFMP Section 5.2.2)
- Weed control measures and revegetation – Condition 3b:

  - Weed management (GGFMP Sections 5.2.3 and 6.2)
  - Revegetation (GGFMP Section 6.4)
- Construction management measures to avoid significant impacts – Condition 3c:
  - Temporary access restrictions (GGFMP Section 5.2.2)
  - Sediment control (GGFMP Section 5.2.4)
  - Works within the GGFMB (GGFMP Section 5.2.5)
- On-site personnel informed of their obligations – Condition 3d:
  - Personnel briefing (GGFMP Section 5.2.1)

A summary of the outcomes of Growling Grass Frog habitat quality monitoring and population monitoring (Section 6.6.2 and Table 7 of the GGFMP) is also provided.

Personnel briefing

A briefing was provided by BL&A on 26th September 2017 to all key personnel on the presence of occurrence of Growling Grass Frog (GGF) in the Kororoit Creek environs and the emergency protocols in the event that the species is encountered during construction. Key personnel present included DFC (Project Management) Pty Ltd project managers, as well as all construction site managers.

Information brochures on this species were provided for display in all site offices, providing a physical description of the species, their population distribution, habitat and similar species. Construction site managers have included this briefing in the environmental briefing for all construction personnel.

Staged construction and temporary access restrictions

As outlined in the compliance reporting against Condition 1, 'No Go' construction fencing was inspected by BL&A in November 2018 and found to restrict the construction of lots and roads associated with residential stages to land comprising Project Areas A1 and B. These project area boundaries fall on the development side of the boundary of the GGFMB in all cases.

During the Nature Advisory November 2020 inspection, a combination of temporary construction fencing and post-and-wire fencing was installed around Project Area A1 to restrict construction to this area. Wire mesh farm fencing was appropriately installed around all areas of retained native vegetation.

During the Nature Advisory October 2021 inspection, a similar combination of fencing was installed around Project Areas A1, A2, C2 and small areas of C1 to restrict construction to these areas and protect areas of retained native vegetation including the Grassland Reserve. In addition to this, as of January 2023, construction fencing was also installed around Project Area D.

At the time of the current Year 6 (October 2023) assessment, a combination of temporary construction fencing and post-and-wire fencing was installed around Project Areas A1, A2, C1. C2 and parts of Project area D. The placement and integrity of temporary construction fencing around the works area was found to be mostly appropriate and sound. Some stretches of fence were found to be leaning causing gaps to occur. Additionally, two larger gaps were observed at either end of a temporary fence where they had not been affixed to adjacent fences. Furthermore, the temporary construction fencing used to surround the works associated with the drainage outfalls is of insufficient height, stability, and gauge. In particular, the fencing used allows access for native wildlife (i.e., Easter Grey Kangaroo) to enter the works area and become trapped or injured. These issues were brought to the attention of the approval holder. Action was immediately taken by repairing construction fencing and installing temporary kangaroo fencing around revegetation and works area to deter Kangaroos from entering and getting trapped.

Weed management

2017/2018: Greening Australia weed management actions

Weeds across Precinct 2 were mapped by Greening Australia in August 2017 as part of their Weed Management Strategy. Weed management across Precinct 2 and including the GGFMB was then undertaken by Greening Australia between September 2017 and October 2018.

Within the GGFMB this included:

- Removal, consolidation and burning of woody weeds (African Boxthorn and Sweet Briar)
- Brush cutting of dead biomass
- Herbicide treatment of grassy and herbaceous weeds – up to eight (8) visits
- Biomass reduction burns – up to six (6) burns

In particular, the following three high-threat weeds that were found to be of greatest threat to environmental values were targeted:

- African Boxthorn (a woody weed);
- Artichoke Thistle (a herbaceous weed); and
- Serrated Tussock (a herbaceous/grassy weed).

During herbaceous weed control visits, the following additional high-threat weeds were also targeted (all but one herbaceous weeds):

- Chilean Needle Grass;
- Fennel;
- Paterson's Curse;
- Scotch Thistle;
- Spear Thistle; and
- Sweet Briar (a woody weed).

2017/2018: Greening Australia weed management outcomes

Weed survey reports from Greening Australia have been prepared for August 2017, February 2018 and June 2018. They document an overall reduction in extent and cover of the three highest threat weed species.

The monitoring inspection undertaken by BL&A in November 2018 of the GGFMB generally concur with the survey results provided by Greening Australia (with minor exceptions), as follows:

- African Boxthorn – in August 2017 found in extremely high numbers within the GGFMB; now observed to be largely eradicated – i.e. less than 1% cover;
- Artichoke Thistle – in August 2017 found in large swathes in and adjacent to the GGFMB in its northern section and at the top of the escarpment near the eastern section at up to 30% cover, including pocket outbreaks with up to 70% cover; now reduced to an overall cover of approximately 20%, with an area in the southeast section exhibiting approximately 30% cover and smaller pocket outbreaks of up to 60% cover; and
- Serrated Tussock – in August 2017 occurring within the GGFMB at cover levels of between 60–100% in all sections except for the southeast corner; now largely controlled to less than 10% cover in the

northwest and reduced to 20% cover on the eastern flank of the GGFMB, it still exhibits very high cover (up to 100%) in a narrow band at the bend in the GGFMB previously described as 'the Point'.

An infestation of Fennel previously recorded in the eastern flank of the GGFBM has also been eradicated.

It is understood that ongoing weed control focused on these remaining outbreaks of Artichoke Thistle and Serrated Tussock within the GGFMB (along with the broader precinct), as well as the remaining target weeds listed above.

2019: Australian Ecosystems weed management outcomes

A weed survey report from Australian Ecosystems has been prepared in October 2019. It documents an overall reduction in extent and cover of the high threat weed species, with the exception of Artichoke Thistle which is germinating readily in areas of exposed soil due to the control of other weeds, namely Serrated Tussock and Twiggy Turnip.

2020: Australian Ecosystems weed management outcomes

Weed survey reports from Australian Ecosystems were prepared in April 2020, June 2020, October 2020 and December 2020. They document an overall reduction in extent and cover of the high threat weed species, mainly due to the targeted and effective control of Artichoke Thistle. However, it states that ongoing management is required, as weed species such as Twiggy Turnip and Artichoke Thistle will take advantage of bare ground areas where previous weed control has taken place.

2021: Australian Ecosystems weed management outcomes

Weed survey reports from Australian Ecosystems were prepared in April, August, October, and December 2021 and are provided in Appendix 5. The reports document low prevalence of some high threat herbaceous weed species (Spear Thistle, Fennel, Cape weed and Paterson's Curse). However, the resulting increase in space has led to increases in high threat weedy grass species (Toowoomba Canary Grass, Chilean Needle Grass and Serrated Tussock) as well as lower threat species such as Wild Oat. The reports state that many Toowoomba Canary Grass plants along the creek have remained untreated so as to reduce erosion concerns. Going forward, the future treatment regime will aim to reduce widespread herbicide treatment where individuals are close to high-value vegetation. Instead, slashing regimes interspersed with selective treatments may be preferred.

2022: Australian Ecosystems weed management outcomes

Weed survey reports from Australian Ecosystems were prepared in March, June and September 2022 and are provided in Appendix 5. The reports document significant overall reduction in extent and cover of the high threat weed species in 2022, mainly driven by removal of woody and herbaceous high-threat weeds. However, whilst management of woody and herbaceous weeds such as African Boxthorn, Bridal Creeper, Artichoke Thistle and Serrated Tussock have been largely successful, cover of Great Brome significantly increased. This latter increase is likely a result of the extended, extremely wet spring growing period rather than an indicator of inadequate management. Future actions should focus on treatments of invasive annual grasses, particularly in proximity to area of retained native vegetation and revegetation works.

The compliance monitoring inspection undertaken by Nature Advisory in October 2022 generally concurs with the 2022 weed survey results provided by Australian Ecosystems. However, it should be noted that two new emergent or newly widespread species were recorded, being Desert Ash along the creekline and Great Brome in vast areas of the precinct including the Grassland Reserve; there was no documentation of this weed by Australian Ecosystems or the 2021 monitoring report.

2023: Australian Ecosystems weed management outcomes

Weed survey reports from Australian Ecosystems were prepared in March, June and September 2023 and are provided in Appendix 5. The reports document significant overall reduction in extent and cover of the high threat weed species in 2023, mainly driven by removal of woody and herbaceous high-threat weeds. However, whilst management of woody and herbaceous weeds such as African Boxthorn, Bridal Creeper, Artichoke Thistle and Serrated Tussock have been largely successful, cover of Great Brome significantly increased. This latter increase is likely a result of the extended, extremely wet spring growing period rather than an indicator of inadequate management. Future actions should focus on treatments of invasive annual grasses, particularly in proximity to area of retained native vegetation and revegetation works.

The compliance monitoring inspection undertaken by Nature Advisory in October 2023 generally concurs with the 2023 weed survey results provided by Australian Ecosystems. Additionally, the two emergent species recorded by Nature Advisory in 2022 (Desert Ash and Great Brome) were still present. Since the October assessment Australian Ecosystems has agreed to expand their targeted weed management to include these species over the next 12 months.

Revegetation

In 2018, large-scale revegetation of the GGFMB had not yet commenced, with the exception of landscaping works associated with a drainage swale constructed within the GGFMB in its northern section. Typical sedge and rush plantings were in good health in this area, and weed cover was negligible due to effective weed-matting.

As of November 2020, revegetation and landscaping works have occurred in the GGFMB in areas adjacent to the recent development in the north-west and the south-east of the precinct. Native grasses, sedges, prostrate shrubs and eucalypts have been planted, and jute mat has been used for weed suppression and erosion control (Photo 1). Supplementary planting has also occurred within retained native vegetation areas that were adjacent to these recently developed areas.

Photo 1: Revegetation works in the south-east portion of the GGFMB

As of October 2021, no further revegetation had occurred. The majority of planted species have survived, grown and began to colonise areas of the jute matting that have degraded (Photo 2). Scattered weeds such as Sow Thistle, Giant Mustard, Wild Oat and Toowoomba Canary-grass were dispersed throughout the revegetation areas at low cover, but are being controlled as evidenced by a number of sprayed and dead individuals.

Photo 2: Well-established grassland revegetation in the north-west of the GGFMB, showing high cover and diversity of native species, and control of Toowoomba Canary-grass

As of October 2022, additional revegetation has occurred within the GGFMB, with jute matting appropriately installed for weed suppression and soil stabilisation. Previously revegetated areas have established well, with most planted species having survived, grown and began to colonise. Native grass species diversity is high and forbs frequently occupying inter-tussock spaces. Weeds such as Sow Thistle, Wild Oat and Toowoomba Canary-grass were scattered throughout the established revegetation areas at low covers.

As of October 2023, revegetation and jute matting was present along much of the GGFMB and adjacent recent development. No additional revegetation was apparent and while some areas are establishing well, much of the GGFMB revegetation areas in the east had been degraded (Photo 3) with low establishment of planted species, damage to jute matting, weed invasion and moderate damage from rabbits. Furthermore, bare ground caused by previous drainage outfalls works has created an optimal site for weed invasion. These issues were brought to the attention of the approval holder for immediate rectification in July 2023. It is understood repair and continued revegetation of these site is planned for autumn 2024. Revegetation in the northwest remains well established.

Photo 3: Evidence of degraded revegetation works along the GGFMB in the east of the study area.

Sediment control

As outlined in the compliance reporting against Condition 2 of the Approval, appropriate sediment and erosion control fencing was observed in 2018 in conjunction with construction fencing on sections of the boundaries of construction areas that occurred on an uninterrupted upslope from Kororoit Creek.

At the three locations where one or more of the fencing panels had fallen, sediment fencing was affected and was not providing an effective barrier. These were brought to the attention of the approval holder for immediate rectification.

No stockpiles, machinery/equipment laydown or washdown areas were observed within the Growling Grass Frog Management Buffer – i.e. within 35 metres of the Kororoit Creek.

The proponent had advised that sediment/erosion control fencing installation was completed by a civil contractor by 6th October 2017. Construction commenced within Project Area A1 on 9th October 2017. (Note: Project Area B construction has now been completed and is addressed in Section 3.6).

At the time of monitoring in November 2020, sediment fencing was not evident outside of completed construction areas. Sediment fencing must be installed to protect areas abutting future construction works prior to their commencement, and must be constructed according to the requirements of Construction Environmental Management Plans approved by Melton City Council – the Responsible Authority for State approvals.

At the time of monitoring in October 2021 and October 2022, appropriate sediment fencing was in place where construction activities are occurring. As noted in 2020, such fencing must be installed to protect areas abutting future construction works prior to their commencement.

During the current Year 6 monitoring (October 2023) sediment fencing was not present around all areas of construction (Photo 4). Sediment fencing was present around some areas of construction and revegetation however this was damaged and had collapsed in many areas therefore not providing an

appropriate barrier to Kororoit Creek from adjacent construction works (Photo 5). These issues were brought to the attention of the approval holder for immediate rectification in July and October 2023.

Photo 4: Sediment fencing not present around areas of earthworks

Photo 5: Collapsed and damaged sediment fencing.

Works in the GGFMB

The November 2018 BL&A inspection noted the recent construction of a sewer connection and drainage outfall within the GGFMB in the northwest of the Precinct 2 project area. It was further observed that temporary construction fencing and sediment/erosion control fencing had been erected around the perimeter of these works, providing a continuous barrier between the works and the Kororoit Creek.

An area of land in the far western section of the GGFMB was observed in November 2018 to be clear of vegetation in preparation for landscaping works. It was understood that silt fencing would be installed along the margin of Kororoit Creek in this area prior to any earthworks, if required.

It was also understood that direct seeding of this area and revegetation works would commence in this area in early 2019.

As of November 2020, revegetation and landscaping works have occurred in the GGFMB in areas adjacent to the recent development in the north-west and the south-east of the precinct. Native grasses, sedges, prostrate shrubs and Eucalypts have been planted, and jute mat has been used for weed suppression and erosion control. A bioswale and drainage outlet into the Kororoit Creek has also been constructed in the south-east portion of the GGFMB.

As of October 2021, no new works have taken place within the GGFMB since the previous monitoring in November 2020. It was evident that weed control had been undertaken across broad sections of the GGFMB area. This weed control had targeted high threat weeds, namely Serrated Tussock and Artichoke Thistle. Wild Oat and Toowoomba Canary-grass were in abundance in the GGFMB. It is understood that these weeds are being retained for the time being to maintain bank stability and avoid erosion. However, these weeds should be slashed as vegetation fringing the creek is currently too dense and tall to be suitable for GGF (Photo 6), as well as to prevent further spread of seed.

As of October 2022, additional works have taken place within the GGFMB since the monitoring in October 2021. It was evident that weed control had been undertaken across broad sections of the GGFMB area. This had targeted high threat weeds, namely Artichoke Thistle and Serrated Tussock. Great Brome, Wild Oat, Chilean Needle-grass and Toowoomba Canary-grass were in abundance in the GGFMB. As noted in 2021, while Toowoomba Canary-grass is being retained for the time being to aid soil stability prior to revegetation works, slashing is required to regularly keep biomass low and impede seed dispersal. At the time of the assessment, rapid spring growth had occurred, and slashing should be undertaken prior to seed set.

Photo 6: High density weed cover adjacent to Kororoit Creek in the GGFMB

During the current year 6 monitoring (October 2023) vegetation within the Growling Grass Frog Buffer zone was largely found to be unsuitable due to excessive growth, and should be maintained as low, grassy vegetation up to 10 centimetres high. In addition, the fence delineating the Growling Grass Frog buffer zone was damaged, broken or loose in numerous areas. These issues were brought to the attention of the approval holder for immediate rectification in July and October 2023. As noted in 2021, while Toowoomba Canary-grass is being retained for the time being to aid soil stability prior to revegetation works, slashing is required to regularly keep biomass low and impede seed dispersal. At the time of the assessment, rapid spring growth had occurred, and slashing should be undertaken prior to seed set (Photo 7).

Photo 7: Tall dense vegetation along Kororoit Creek within the GGFMB as of October 2023

The approval holder has since provided evidence that slashing has now taken place within the GGFMB and biomass appears to be maintained to suitable levels for GGF (Photo 8).

Photo 8: Evidence of slashing within GGFMB as of December 2023

Habitat and population monitoring

Pre-construction Growling Grass Frog population and habitat monitoring commenced in January 2017 during the November 2016–February 2017 breeding season. A further four annual breeding season population and habitat monitoring events were undertaken in November 2017 (one month following commencement of construction (Year 1), December 2018/January 2019 (Year 2), November 2019 (Year 3), November 2020 (Year 4), December 2021 (Year 5), December 2022 (Year 6) and December 2023 (Year 7). The reporting for the Year 7 monitoring event is provided in Appendix 2 and a summary provided below.

During each monitoring event, the following was undertaken:

- A habitat assessment was conducted with photographs and habitat notes taken at three survey sites from 2017 to 2020, with a fourth survey site added in 2021. Particular attention was paid to the presence of in-stream and fringing creek-edge vegetation; and
- Call playback and visual search surveys were conducted over two nights during appropriate weather conditions at each of the survey sites after dusk for each monitoring event.

Call playback and visual search surveys were conducted by Nature Advisory at the four survey sites on 5th December 2023. Weather conditions were considered appropriate to detect Growling Grass Frog. The Year 7 monitoring survey did not detect the presence of Growling Grass Frog within the study area. Absence of Growling Grass Frog for the third season in a row suggests that Growling Grass Frog have been displaced from the study area and the study area is too isolated to allow repopulation from other sites. It is possible that flooding of the local waterways has impacted water quality and possibly displaced Growling Grass Frog from suitable habitat within the study area, however more common frog species are persisting in the area. At a nearby reference site, Growling Grass Frogs were recorded on both evenings responding to playback prior to surveying the study area, these observations indicate the species is active and that conditions were suitable to record GGF during the surveys.

In accordance the with the GGFMP, failure to detect Growling Grass Frog over the course of two annual rounds of population monitoring is a trigger which requires corrective action. Testing of water quality upstream and downstream of outfalls (beyond mixing zone) to determine the influence of stormwater inputs and whether water quality meets the objectives for water quality in the catchments of Port Phillip Bay as per the SEPP (Waters of Victoria) guidelines is required (BLA 2017). Water quality monitoring of Kororoit Creek was undertaken in May 2023 and found water quality in the three Kororoit Creek sites and one constructed wetland site were all within the range typically observed in urban waterways with few minor exceedances detailed in the Water Quality Monitoring Report in Appendix 9 (Aquatica Environmental 2023)

3.3. Condition 5 – Spiny Rice-flower impacts in Project Area A1

Condition 5 of the Approval reads:

5. The **approval holder** must ensure that the action does not impact more than eleven (11) individual **Spiny Rice-flower** plants within the combined area of **Project Areas A1** and **A2.**

As of November 2020, construction has commenced in Project Area A1 only.

A survey of Spiny Rice-flower in Project Areas A1 and A2 was undertaken by BL&A on 8th August 2016. This survey recorded a total of eleven (11) Spiny Rice-flower plants compared to the seven (7) Spiny Rice-flower previously approved for removal in these project areas. Of these previously identified plants, some were found to be still present whilst others had since died.

An application for a variation to the Approval was made by the proponent and the Approval was varied by the Department in January 2017 to allow for the removal of these eleven plants.

The eleven plants recorded in 2016 were separated spatially across the combined area of Project Areas A1 and A2 (approximately 35 hectares in area), with most occurring as isolated individuals. Given the large combined area of Project Areas A1 and A2 and the isolated nature of many of the records from August 2016 leading to a reduced likelihood of recruitment and an increased likelihood of plant attrition, it is considered unlikely that this number will have increased prior to the commencement of construction in October 2017.

No additional surveys were conducted into the status of these plants in 2020, 2021, 2022 or 2023.

3.4. Condition 6 – Project Area A1 offsets secured and implemented

Condition 6 of the Approval reads:

6. The approval holder must not commence **construction activities** in **Project Area A1** until the following are met:
   a. A direct offset, consistent with the **EPBC Act Environmental Offsets Policy**, has been secured to compensate for the impacts to 6.053 hectares of **NTGVVP** and 6.053 hectares of **Striped Legless Lizard habitat**;
      i. An **offset management plan** has been prepared and submitted to the **Minister** for approval, and the **approval holder** has received written confirmation that the **offset management plan** has been approved. The approved **offset management plan** must be implemented by the **approval holder**; and
      ii. The **Department** has been provided with written confirmation and supporting evidence demonstrating that the offset has been secured.

BL&A Report 7045 (46.2) *Modeina Estate Project Area A1 EPBC Act Offset Management Plan* was approved by the Minister on 20th September 2017. Written evidence of the securing of the Karabeal offset site by way of a Section 69 Agreement under the *Conservation, Forests and Lands Act 1987* (Vic.) had been provided to the Department via email on 12th May 2017. Construction activities commenced in Project Area A1 on 9th October 2017.

The EPBC Act offsets for impacts to 6.053 hectares of *Natural Temperate Grassland of the Victorian Volcanic Plain* (NTGVVP) and 6.053 hectares of Striped Legless Lizard habitat were secured across part of a property in Karabeal in Victoria's west.

Implementation of the offset had commenced immediately following the execution of the Section 69 Agreement on 3rd April 2017. The first annual monitoring report was provided to the Victorian Department of Environment, Land, Water and Planning (DELWP) on 21st April 2018.

Work undertaken in the first year (2018) included the following actions:

- Ongoing monitoring of boundary fencing – continued to be in stock-proof condition
- Ongoing monitoring for woody weeds – little or no cover of woody weeds identified
- Quarterly monitoring for pest animals – little to no activity identified.

Works undertaken in the second year (2019) included the following actions:

- Ongoing monitoring of woody weeds and eradication where identified
- Control of herbaceous weeds including Toowoomba Canary-grass, Yorkshire Fog, Paspalum, Spear Thistle and South African Orchid
- Fox shooting as required
- Monitoring for rabbit warrens and removal as required
- Ecological burning as required

- Strategic grazing as required (following formal approval from DELWP for this activity – not currently included in the Management Plan for the site).

A site inspection by DELWP on 13 August 2019 determined that deeming of compliance was reliant on the meeting the following obligations:

- Woody weeds – ensure all woody weeds are cut and painted as per the Management Plan.
- Herbaceous weed control – ensure high threat weeds are controlled.
- Fencing – realign the northern boundary fence to match the site area.
- Rubbish – remove old internal fencing wire and any rubbish from the sites.

The following were also noted:

- Ecological burning was recommended as an additional weed control measure.
- Burrows are to be monitored to determine the species responsible and eradication action taken if resulting from pest presence.
- No evidence of Red Fox was found.

Works undertaken by the landholder in the third year (2020) included the following actions:

- Firebreaks prepared and cool burning of areas 2 and 3
- Lopping and chemical treatment of Cypress and Ash trees
- Removal of corrugated iron and posts in the creek areas

Works undertaken by the landholder in the fourth year (2021) included the following actions:

- Cool burning of site 4/mosaic burn in June
- Burning dead Cypress trees
- Weed control works such as spraying grassy weeds and cut-and-pasting woody weeds
- Commenced removal of old fence in the creek area (75%)

The 2022 management practices within the Karabeal offset site included the following actions:

- Maintained perimeter fencing (stockproof)
- Relocation of fencing in wrong location
- Control of woody and herbaceous weeds
- Pest animal control (rabbits and foxes)
- Biomass control with grazing and controlled burning

The 2023 management practices within the Karabeal offset site are provided in Appendix 7, and included the following actions:

- Maintained existing and install additional fencing (stockproof)
- Control of wood and herbaceous weeds
- Pest animal control (rabbits and foxes)
- Biomass control with grazing and controlled burning

3.5. Condition 6A – Project Area A2 offsets secured

Condition 6A of the Approval reads:

6A. The approval holder must not commence **construction activities** in **Project Area A2** until either 6A(a) or 6A(b) are met:

a. A direct offset, consistent with the **EPBC Act Environmental Offsets Policy**, has been secured to compensate for the impacts to 4.277 hectares of **NTGVVP** and 4.277 hectares of **Striped Legless Lizard habitat**;

i. An **offset management plan** has been prepared and submitted to the **Minister** for approval, and the **approval holder** has received written confirmation that the **offset management plan** has been approved. The approved **offset management plan** must be implemented by the **approval holder**; and

ii. The **Department** has been provided with written confirmation and supporting evidence demonstrating that the offset has been secured;

OR

b. In a manner consistent with the **Melbourne Urban Development Policy**, secure an offset for impacts to 4.277 hectares of **NTGVVP** and 4.277 hectares of **Striped Legless Lizard habitat** associated with **Project Area A2**. Documentary evidence that the offset has been secured must be provided to the **Department** with 14 days of being secured.

Condition 6A compliance

MUD Policy payment

The proponent has made payment under the Melbourne Urban Development Policy for offsets under the MUD Policy to compensate for the impacts to 4.277 hectares of NTGVVP and 4.277 hectares of Striped Legless Lizard habitat. Proof of this payment has been provided to the Department.

Therefore, the required offsets for Condition 6A have been secured, the condition met, and works may commence in Project Area A2.

3.6. Conditions 7 & 8 – Project Area B offsets secured and implemented

Conditions 7 and 8 of the Approval read:

7. The **approval holder** must not commence **construction activities** in **Project Area B** until either 7(a) or 7(b) are met:

a. A direct offset containing a minimum of 100 **Spiny Rice-flower** plants has been secured;

i. An **offset management plan** has been prepared and submitted to the **Minister** for approval, and the **approval holder** has received written confirmation that the **offset management plan** has been approved. The approved **offset management plan** must be implemented by the **approval holder**; and

ii. The **Department** has been provided with written confirmation and supporting evidence that demonstrate the offset has been secured.

b. The **Minister** agrees in writing that condition 15 (a–e) has been satisfied.

8. The **approval holder** must not commence **construction activities** in **Project Area B** until the following are met:

c. A direct offset, consistent with the **EPBC Act Environmental Offsets Policy**, has been secured to compensate for the impacts to 1.824 hectares of **NTGVVP** and 1.824 hectares of **Striped Legless Lizard habitat**;

i. An **offset management plan** has been prepared and submitted to the **Minister** for approval, and the **approval holder** has received written confirmation that the

offset management plan has been approved. The approved **offset management plan** must be implemented by the **approval holder**; and

ii. The **Department** has been provided with written confirmation and supporting evidence that demonstrate the offset has been secured.

Conditions 7 & 8 compliance

BL&A Report 7045 (35.4) *Modeina Estate Precinct 2 – Project Area B (School Site) EPBC Act Offset Management Plan* was approved by the Minister on 7th March 2017 and written evidence of the securing of two offset sites (Campbelltown and Karabeal) by way of a Section 69 Agreement under the *Conservation, Forests and Lands Act 1987* (Vic.) provided to the Department via email on 12th May 2017. Native vegetation removal and construction of the school site within Project Area B was undertaken in January 2018.

The EPBC Act direct offset of 100 Spiny Rice-flower was secured on the Campbelltown offset site in Victoria's west; the direct offset for impacts to 1.824 hectares of *Natural Temperate Grassland of the Victorian Volcanic Plain* (NTGVVP) and 1.824 hectares of Striped Legless Lizard habitat were secured across part of the Karabeal property.

Implementation of the offset across both sites had commenced immediately following the execution of the Section 69 Agreements on 3rd April 2017. The first annual monitoring report was provided to the Victorian Department of Environment, Land, Water and Planning (DELWP) on 21st April 2018.

Work undertaken by the landholder in the first year included the actions outlined below.

Campbelltown

- Fencing of individual offset sites within the broader property by July 2017
- Limited eradication of woody weeds in Spring and Autumn 2017
- Fox shooting undertaken

Karabeal

- Ongoing monitoring of boundary fencing – continued to be in stock-proof condition
- Ongoing monitoring for woody weeds – little or no cover of woody weeds identified
- Quarterly monitoring for pest animals – little to no activity identified

Work to be undertaken by the landholder in the second year included the actions outlined below.

Campbelltown

- Ongoing eradication of woody weeds
- Control of herbaceous weeds including Toowoomba Canary Grass, Spear Thistle and St John's Wort
- Fox shooting as required
- Monitoring for rabbit warrens and removal as required
- Strategic grazing as required
- Ecological burning as required

Karabeal

- Ongoing monitoring of woody weeds and eradication where identified

- Control of herbaceous weeds including Toowoomba Canary Grass, Yorkshire Fog, Paspalum, Spear Thistle and South African Orchid
- Fox shooting as required
- Monitoring for rabbit warrens and removal as required
- Ecological burning as required
- Strategic grazing as required (following formal approval from DELWP for this activity – not currently included in the Management Plan for the site).

Work undertaken by the landholder in the third year included the actions outlined below.

Campbelltown

- Fumigation and collapsing of burrow of European Rabbit recorded just outside the site's southern boundary.
- Control of all woody weeds including Sweet Briar regrowth and Plum and remove all fruits and cut branches.
- Control of herbaceous weeds including Toowoomba Canary Grass, St John's Wort, Bulbous Meadow-grass, Cat's Ear, Cocksfoot, Spear Thistle, Ribwort, Dock and Brown-top Bent.
- Remove wire from internal fencing.
- Monitoring for any impacts to growth of seeding of native grasses by kangaroos and control if required.
- Strategic grazing as required.
- Ecological burning as required.

Karabeal

- Re-align fencing to the east to match site area.
- Remove unused fencing, wire and old iron.
- Remove internal fencing unless pulse grazing is to be implemented.
- Monitor small burrows to determine species responsible and control if required.
- Control of all woody weeds including Boxthorn and non-indigenous species including Blue Gum, Spotted Gum, Cypress and Ash.
- Introduce higher level of weed control than originally prescribed in the Management Plan, incorporating spot spraying and burning and consider addition of strategic pulse grazing to reduce weed cover.
- Liaise with local CMA to control erosion along drainage line and continue to monitor for any increase.
- Assign names to paddocks to allow for greater clarity of management action requirements and accuracy of specific practices.

Work undertaken by the landholder in the fourth year included the actions outlined below.

Campbelltown

- Fumigation of European Rabbit burrows.
- Cutting and pasting of Sweet Briar plants, burning of Blackberry bushes and control of Artichoke Thistle and non-native Dock.

- Monitoring for any other weeds and vermin.

Karabeal

- Firebreaks prepared and cool burning of areas 2 and 3
- Lopping and chemical treatment of Cypress and Ash trees
- Removal of corrugated iron and posts in the creek areas

Work undertaken by the landholder in the fifth year included the actions outlined below.

Campbelltown

- Maintained perimeter fencing (stockproof)
- Monitoring and control of woody and herbaceous weeds
- Monitoring and control of pest animals (rabbits and foxes)
- Biomass control with grazing, noted that a controlled burn had been undertaken in Year 4

Karabeal

- Maintained perimeter fencing (stockproof)
- Relocation of fencing that was positioned incorrectly
- Monitoring and control of woody weeds
- Pest animal control (rabbits and foxes)
- Noted that a mosaic burn had been undertaken in Year 4

Work undertaken by the landholder in the sixth year included the actions outlined below.

Campbelltown

- Maintained existing and install additional fencing (stockproof)
- Monitoring and control of woody and herbaceous weeds
- Monitoring and control of pest animals (rabbits and foxes)
- Biomass

Karabeal

- Maintained existing and install additional fencing (stock/vermin proof)
- Control of wood and herbaceous weeds
- Pest animal control (rabbits and foxes)
- Install grazing prevention enclosures to reduce pressure from Macropod grazing
- Biomass control with grazing and controlled burning

Annual monitoring reports conducted by the landowner are provided for Karabeal and Campbelltown in Appendix 7 and Appendix 8 respectively.

3.7. Conditions 13, 14, 16 & 17 – no construction activities in Project Areas C1, C2 & D

Conditions 13, 14, 16 and 17 of the Approval read (in part, paraphrased):

13. The **approval holder** must not commence **construction activities** in **Project Area C2** until… [direct offsets are secured for impacts to NTGVVP, Striped Legless Lizard habitat and Spiny Rice-flower].
14. The **approval holder** must not undertake **construction activities** within the Grassland Reserve, to be located in **Project Area B** as per Appendix 1.

16. The **approval holder** must not commence **construction activities** in **Project Area D** until… [a direct offset is secured for impacts to NTGVVP, Striped Legless Lizard habitat].
17. If condition 15 (a–d) cannot be met in full:
    a. the **approval holder** must not commence **construction activities** within **Project Area D**; until the following are met:
        i. Adequately compensate for impacts to **Spiny Rice-flower** plants located within **Project Area D** with an alternative offset. This offset strategy must be prepared following consultation with the **Department**; and
        ii. The **Minister** has provided written notification to the **approval holder** that conditions 14 and 15 no longer apply.

Conditions 13, 14 & 16 compliance

Offsets secured for Project Areas C1, C2 & D

The Nature Advisory November 2021 site inspection determined that no construction had commenced in Project Area D (including the Grassland Reserve), but that construction had commenced in Project Area C1 and C2. Evidence that an appropriate offset has been secured has been provided (Cressy Offset Site). The perimeter of the Grassland Reserve was fenced with a wire mesh fence in February 2017 and remains in place and is of suitable design. The 2020 monitoring report recommended that the gate in the south-eastern corner be made rabbit-proof, and appropriate modifications have since been made.

The Nature Advisory November 2022 site inspection determined that construction had commenced within Project Area D and C2 (including the Grassland Reserve) in September 2022, but no construction had commenced within Project Area C1.

The Nature Advisory November 2023 site inspection determined that construction has commenced in Project Areas C1, C2 and D.

Condition 17 compliance

Alternative offset

BL&A Report 7045 (51.4) *Modeina Precinct 2 – Spiny Rice-Flower Alternative Offset Strategy* was approved by the Minister on 9th November 2018.

Project Areas C1, C2 & D Offset Management Plan

BL&A Report 7045 (55.2) *Modeina Precinct 2, Project Areas C1, C2 & D – Cressy Offset Management Plan* was approved by the Minister on 9th November 2018.

Implementation of the offset had commenced immediately following the execution of the TFN Covenant on 20th March 2019. The fourth annual monitoring report is provided as Appendix 6.

Construction may now commence in Project Area C1.

Evidence that Condition 15 no longer applies

Written notification that Condition 15 no longer applies was provided by the Department by email on 28th November 2018 (Appendix 3).

3.8. Condition 14A – Grassland Reserve Management Plan

Condition 14A of the Approval reads:

> 14A. The **approval holder** must, in consultation with a **suitably qualified ecologist**, develop a **Grassland Reserve Management Plan** for the protection and management of **protected matters** within the **Grassland Reserve**. The **Grassland Reserve Management Plan** must be submitted to the **Minister** for approval 6 months prior to the commencement of **construction activities** within 100 metres of **Project Area D**. The approved **Grassland Reserve Management Plan** must be implemented.
>
> The **Grassland Reserve Management Plan** must:
>
> a. include existing baseline data and other supporting evidence that documents the baseline conditions of **protected matters** within the **Grassland Reserve**;
>
> b. outline specific management actions to protect and maintain **protected matters** within the **Grassland Reserve**; and
>
> c. outline annual monitoring and reporting on the condition of **protected matters** within the **Grassland Reserve** for a period of 10 years from the commencement of the Plan.

Condition 14A compliance

BL&A Report 7045 (43.4) *Modeina Estate, Burnside – Grassland Reserve Management Plan* was submitted to the Minister for approval on 8th May 2018 and was approved by the Minister on 9th November 2018 and is available for viewing on the proponent's website at https://www.denniscorp.com.au/about-dennis-family/initiatives-and-awards/sustainability/.
Construction activities were found not to have occurred within 100 metres of either Project Area D or the Grassland Reserve during the November 2020 Nature Advisory inspection.

This compliance reporting is made against the construction phase management and monitoring actions outlined in Appendix 4 of the GRMP. These actions and the relevant section of the GRMP are listed below under the three core requirements of the Plan outlined in Condition 14A:

- Baseline data – Condition 14A (a) (GRMP Section 3.4.1)
- Construction and 10-year management actions – Condition 14A (b) (GRMP Sections 3.3 & 3.4)
- Monitoring and reporting – Condition 14A (c) (GRMP Section 3.5)

Vegetation overview

Baseline data

Baseline data on the condition, overall weed cover and individual high-threat weed covers was collected during the November 2018 BL&A site inspection.

As of November 2018, the Grassland Reserve was considered to comprise the following:

- 65% cover of native flora;
- 20% cover of introduced flora (weeds); and
- 15% cover of organic matter (leaf litter) and inter-tussock spaces.

Monitoring and reporting – Year 2

Year 2 assessment on the condition, overall weed cover and individual high-threat weed covers was collected during the December 2019 Nature Advisory site inspection.

As of December 2019, the Grassland Reserve was considered to comprise the following:

- 70% cover of native flora;
- 15% cover of introduced flora (weeds); and
- 15% cover of organic matter (leaf litter) and inter-tussock spaces.

A 5% increase in cover of native flora and consequently a 5% reduction in introduced species cover has been recorded since the previous monitoring report in November 2018.

Kangaroo Grass was the dominant grass species in the reserve. While grassy cover was high, a suitable amount of inter-tussock space was present allowing for a diversity of other native flora to occur including Spiny Rice-flower (*Pimelea spinescens subsp. spinescens*), Pink Bindweed (*Convolvulus sp.*), Common Fireweed (*Senecio quadridentatus*), Black Cottonbush (*Maireana decalvans*), Kidney Weed (*Dichondra repens*), Black-anther Flax-lily (*Dianella revoluta*) and Narrow Plantain (*Plantago gaudichaudii*).

Arching Flax-lily (*Dianella longifolia var. grandis*), listed as vulnerable on the DELWP Advisory List of Threatened Plants in Victoria (DELWP Advisory list) was known to occur in the reserve, and was still present during the December 2019 monitoring.

Fragrant Saltbush (*Rhagodia parabolica*), listed as rare on the DELWP Advisory List, was also re-recorded in the reserve during the December 2019 monitoring.

A reduction in cover of Wild Oat from 12% to 6% is likely attributed to well-timed and managed environmental burns, reducing the biomass before the grass sets seed, creating inter-tussock space for a suite of native species to recruit. This is also likely the reason for the emergence of new weeds such as Galenia, Onion Grass and Delicate Hair-grass, and the increase in cover of other weed species such as Squirrel-tail Fescue and Large Quaking Grass.

Selective herbicide control has seen the reduction and potential eradication of a range of exotic species, namely; Serrated Tussock, Artichoke Thistle, Ox-tongue and Big Heron's-bill.

Monitoring and reporting – Year 3

Year 3 assessment on the condition, overall weed cover and individual high-threat weed covers was collected during the November 2020 Nature Advisory site inspection.

As of November 2020, the Grassland Reserve was considered to comprise the following:

- 80% cover of native flora;
- 10% cover of introduced flora (weeds); and
- 17% cover of organic matter (leaf litter) and inter-tussock spaces.

A 10% increase in cover of native flora and consequently a 5% reduction in introduced species cover has been recorded since the previous monitoring report in December 2019, continuing the trend of an increase in quality since the baseline report in 2018.

Kangaroo Grass continues to be the dominant grass species in the reserve. While grass cover was high, a suitable amount of inter-tussock space was present in the most recently burnt area, allowing for a diversity of other native flora to occur, including Spiny Rice-flower (*Pimelea spinescens* subsp. *spinescens*), Pink Bindweed (*Convolvulus angustissimus*), Common Fireweed (*Senecio quadridentatus*), Blue Grass-lily (*Caesia calliaantha*), Kidney Weed (*Dichondra repens*), Black-anther Flax-lily (*Dianella revoluta*) and Yellow Rush-lily (*Tricoryne elatior*). In areas which were not recently burnt, inter tussock spacing was low, subsequently resulting in less native flora diversity.

Arching Flax-lily (*Dianella longifolia* var. *grandis*), listed as vulnerable on the DELWP Advisory List of Threatened Plants in Victoria (DELWP Advisory list) was known to occur in the reserve, and was still present during the November 2020 monitoring.

Fragrant Saltbush (*Rhagodia parabolica*), listed as rare on the DELWP Advisory List, was also re-recorded in the reserve during the most recent visit.

A reduction in overall weed cover is likely attributed to well-timed and managed environmental burns and selective weed control, reducing the biomass before the grass sets seed, enabling native grasses to dominate. However, this is also likely the reason for the emergence of new weeds such as Sow Thistle, Prickly Lettuce and Cocksfoot; the re-emergence of Artichoke Thistle, Red Brome and Serrated Tussock; and the increase in cover of other weed species such as Pimpernel and Rye Grass (Table 1). These species have all readily recruited on exposed ground from weed control. It is recommended that indigenous grass species such as Kangaroo Grass or Spear Grasses are planted into areas which have been subject to weed control, primarily along the eastern edge of the reserve.

Concerningly, the following high threat weeds have emerged within the reserve; Paterson's Curse, South African Orchid and Gazania. These species are currently at a negligible cover, but are required to be controlled immediately. During the assessment, individual plants were hand removed.

Additionally, Drooping Cassinia, previously considered native, is now considered an invasive weed. Five individual plants were recorded within the grassland reserve. This species can rapidly colonise an area and is therefore required to be eradicated.

An estimate of cover for weed species in the grassland reserve against estimates in 2018 and 2019 are presented in Table 1. Plants highlighted in grey are considered to be weeds which must be a priority in future weed management of the reserve. Green indicated a reduction in cover, while orange indicates an increase.

Monitoring and reporting – Year 4

Year 4 assessment on the condition, overall weed cover and individual high-threat weed covers was collected during the October 2021 Nature Advisory site inspection.

As of October 2021, the Grassland Reserve was considered to comprise the following:

- 75% cover of native flora;
- 15% cover of introduced flora (weeds); and
- 16% cover of organic matter (leaf litter) and inter-tussock spaces.

The cover of native and introduced flora has remained relatively stable since the last monitoring survey in December 2020. Native flora cover decreased by 5% and weed cover increased by 5%.

The combined cover of organic matter and inter-tussock spaces has remained relatively stable with a slight (1%) decline. The changes in covers observed are within normal limits.

Kangaroo Grass continues to be the dominant grass species in the reserve. A diverse range of indigenous species occurred in inter-tussock spaces including Spiny Rice-flower (*Pimelea spinescens* subsp. *spinescens*), Black-anther Flax-lily (*Dianella revoluta*), Sheep's Burr (*Acaena echinata*), Blue Grass-lily (*Caesia calliantha*), Grassland Wood-sorrel (*Oxalis perennans*), Common Woodruff (*Asperula conferta*) and Kidney Weed (*Dichondra repens*) amongst others. These species were largely confined to parts of the reserve which had been burnt in 2019.

The presence of Spiny Rice-flower, listed as Critically Endangered under both the EPBC Act and the FFG Act, is discussed in greater detail below.

Three Arching Flax-lily (*Dianella longifolia* var. *grandis*) were found within the reserve. This species is listed as Critically Endangered under the FFG Act.

One Fragrant Saltbush (*Rhagodia parabolica*), listed as Vulnerable under the FFG Act, was also detected in the reserve.

High-threat weeds detected and removed during the monitoring survey in 2020, namely Paterson's Curse, South African Orchid and Gazania, were not observed during the recent site assessment. Five additional weed species were detected since the previous monitoring survey including one Horehound plant.

The increase in weed cover observed is largely due to an increase in the cover of Serrated Tussock, Wild Oat, Drooping Cassinia and Ribwort. Of these species, Drooping Cassinia and Serrated Tussock are considered to be of most concern, with the capacity to outcompete even perennial native species. Weed cover remains high towards the northern and eastern boundaries of the reserve and control efforts should focus on these areas.

Monitoring and reporting – Year 5

Year 5 assessment on the condition, overall weed cover and individual high-threat weed covers was collected during the October 2022 Nature Advisory site inspection.

As of October 2022, the Grassland Reserve was considered to comprise the following:

- 58% cover of native flora
- 35% cover of introduced flora
- 6% cover of organic matter (leaf litter)
- 18% cover of inter-tussock spaces and
- 15% cover of bare ground

This represents a 17% decrease in cover of native flora since the previous monitoring. It should be noted that this decrease is in the relative proportion of area covered by native species, and does not necessarily correlate with a decline in the amount of native vegetation present. Kangaroo Grass continues to be the dominant grass species in the reserve.

The overall weed cover in the grassland reserve was estimated to be 35%, which is 20% more than the previous monitoring. The main factor driving this increase is likely the extended, mild spring weather with continuous high rainfall, with such conditions particularly conducive to enhanced growth of annual exotic grasses. This likely also coincided with bare ground made available following the ecological burn.

The presence of Spiny Rice-flower, listed as Critically Endangered under both the EPBC Act and the FFG Act, is discussed in greater detail below.

Two Arching Flax-lily (*Dianella longifolia* var. *grandis*) were found within the reserve. This species is listed as Critically Endangered under the FFG Act.

One Fragrant Saltbush (*Rhagodia parabolica*), listed as Vulnerable under the FFG Act, was also detected in the reserve as per previous surveys. This species does not naturally occur within grasslands and has likely arisen from bird distribution from local landscaping planting.

Introduced species were evenly distributed throughout the recently burnt area with Squirrel-tail Fescue, Pimpernel and Wild Oat being the most dominant species. The cover of weeds in the unburnt area was low in the western section and high in the eastern section near the boundary. A high cover of Wild Oats

was the dominant weed within this area (Photo 9). In addition, the perimeter of the entire reserve had a high cover of weeds, including species such as Wild Oats, Squirrel-tail Fescue and Giant Mustard. Individuals of the high threat weed, Artichoke Thistle *Cynara cardunculus* subsp. *flavescens*, were also observed scattered within the unburnt area.

Photo 9: Weed cover is high near the eastern boundary

Monitoring and reporting – Year 6

Year 6 assessment on the condition, overall weed cover and individual high-threat weed covers was collected during the October 2023 Nature Advisory site inspection.

As of October 2023, the Grassland Reserve was considered to comprise the following:

- 60% cover of native flora
- 35% cover of introduced flora
- 5% cover of organic matter (leaf litter)
- 15% cover of inter-tussock spaces and
- 10% cover of bare ground

The cover of native and introduced flora has remained relatively stable since the last monitoring survey in October 2022. Native flora cover increased by 2% and weed cover remained at 35%. Organic matter has remained similarly stable decreasing by 1%. Inter-tussock spaces decreased by 3% and bare ground decreased by 5%. Overall, the condition of the grassland reserve has had little to no improvement in response to the controlled burning in year 5 from the annual monitoring assessment in 2022.

Weed cover remains high primarily due to an abundance of annual grasses, which includes Wild Oat and Squirrel-tail Fescue. These species are most likely responding to the extended, mild spring weather with continuous high rainfall and limited post fire weed control of which being particularly conducive to

enhanced growth of annual exotic grasses. The previous report in 2022 also stated that the unburnt areas in the western section had a higher cover of native vegetation and a low cover of weeds compared to the eastern aspect of the site. In-field observations in 2023 suggest that this has been exacerbated over time with little management and mitigation actions to limit the spread of the Wild Oat and other introduced grass species. The effect of annual grass domination limits the ability of grassland species to persist and colonise bare ground.

Introduced species were unevenly distributed throughout the reserve, however, Squirrel-tail Fescue, Wild Oat, Ribwort, Red Brome were consistently the most dominant species. Other weeds that could pose a threat in future include Large Quaking-grass, Lesser Quaking-grass and Great Brome. These species should be managed to reduce their increasing cover so that native species can regenerate in these areas.

The presence of Spiny Rice-flower, listed as Critically Endangered under both the EPBC Act and the FFG Act, is discussed in greater detail below. One individual of Fragrant Saltbush, listed as Vulnerable under the FFG Act, was also detected in the reserve. This species does not naturally occur within grasslands and has likely arisen from bird distribution from local landscaping planting. It should be removed from the reserve as it will displace native species.

Photo 10: Area of high weed cover in the east of the Grassland Reserve

Table 1: Weed cover estimates – Grassland Reserve

Common name	Species name	Cover estimate 2018	Cover estimate 2019	Cover estimate 2020	Cover estimate 2021	Cover estimate 2022	Cover estimate 2023	Notes 2023
African Box-thorn	*Lycium ferocissimum*	<1%	<1%	<1%	<1%	0%	0%	Not observed
Artichoke Thistle	*Cynara cardunculus* subsp. *flavescens*	<1%	0%	<1%	<1%	<1%	<1%	Observed on western boundary. Evidence of weed control
Big Heron's-bill	*Erodium botrys*	<1%	0%	<1%	<1%	<1%	0%	Not observed
Black Medic	*Medicago lupulina*	0%	0%	<1%	<1%	<1%	0%	Not observed
Burr Medic	*Medicago polymorpha*	0%	0%	0%	<1%	<1%	0%	Not observed
Charlock	*Sinapsis arvensis*	0%	0%	0%	0%	<1%	0%	Not observed
Chilean Needle-grass	*Nassella neesiana*	<1%	0%	0%	<1%	0%	0%	Not observed
Cleavers	*Galium aparine*	0%	0%	<1%	0%	<1%	<1%	Scattered throughout
Cocksfoot	*Dactylis glomerata*	0%	0%	<1%	<1%	0%	0%	Not observed

Common name	Species name	Cover estimate 2018	Cover estimate 2019	Cover estimate 2020	Cover estimate 2021	Cover estimate 2022	Cover estimate 2023	Notes 2023
Common Centaury	*Centaurium erythraea*	0%	0%	0%	<1%	0%	<1%	Scattered throughout
Delicate Hair-grass	*Aira elegantissima*	0%	<1%	1%	1%	<1%	5%	Increasing in cover
Drooping Cassinia	*Cassinia sifton*	*	*	<1%	1%	0%	0%	Not observed
Flatweed	*Hypochaeris radicata*	0%	0%	<1%	<1%	0%	<1%	Scattered throughout
Galenia	*Galenia pubescens* var. *pubescens*	0%	<1%	0%	0%	0%	0%	Not observed
Gazania	*Gazania linearis*	0%	0%	<1%	0%	0%	0%	Not observed
Giant Mustard	*Rapistrum rugosum*	0%	0%	0%	0%	1%	0%	Not observed
Great Brome	*Bromus diandrus*	0%	0%	0%	0%	<1%	3%	Increasing in cover
Horehound	*Marrubium vulgare*	0%	0%	0%	<1%	0%	0%	Not observed
Large Quaking-grass	*Briza maxima*	2%	3%	<1%	<1%	<1%	2%	Scattered throughout.
Lesser Quaking-grass	*Briza minor*	0%	0%	0%	<1%	<1%	2%	Scattered throughout.

Common name	Species name	Cover estimate 2018	Cover estimate 2019	Cover estimate 2020	Cover estimate 2021	Cover estimate 2022	Cover estimate 2023	Notes 2023
Narrow-leaved Clover	*Trifolium angustifolium*	<1%	<1%	<1%	0%	<1%	<1%	Scattered throughout.
Onion Grass	*Romulea rosea*	0%	2%	<1%	<1%	1%	<1%	Scattered throughout.
Ox-tongue	*Helminthotheca echioides*	<1%	0%	0%	<1%	<1%	0%	Not observed
Paterson's Curse	*Echium plantagineum*	0%	0%	<1%	0%	0%	0%	Not observed
Perennial Veldt-grass	*Ehrharta calycina*	0%	0%	0%	<1%	0%	0%	Not observed
Pimpernel	*Lysimachia arvensis*	<1%	<1%	1%	1%	1%	<1%	Scattered throughout.
Prickly Lettuce	*Lactuca serriola*	0%	0%	<1%	<1%	<1%	<1%	Scattered throughout.
Red Brome	*Bromus rubens*	<1%	0%	<1%	<1%	0%	10%	Dense infestation along the eastern boundary.
Soft Brome	*Bromus hordaceus*	-	-	-	-	-	2%	Newly recorded species

Common name	Species name	Cover estimate 2018	Cover estimate 2019	Cover estimate 2020	Cover estimate 2021	Cover estimate 2022	Cover estimate 2023	Notes 2023
Ribwort	*Plantago lanceolata*	3%	1%	<1%	1%	1%	5%	Scattered throughout
Rye Grass	*Lolium* sp.	1%	<1%	<1%	0%	0%	<1%	Scattered throughout
Serrated Tussock	*Nassella trichotoma*	<1%	0%	1%	3%	1%	1%	Scattered throughout.
South African Orchid	*Disa bracteata*	0%	0%	<1%	0%	0%	0%	Not observed
Sow Thistle	*Sonchus* spp.	0%	0%	1%	<1%	1%	1%	Scattered throughout.
Squirrel-tail Fescue	*Vulpia bromoides*	1%	2%	1%	1%	8%	10%	Observed along eastern boundary
Twiggy Turnip	*Brassica fruticulosa*	<1%	<1%	<1%	<1%	0%	1%	Observed along eastern boundary

Common name	Species name	Cover estimate 2018	Cover estimate 2019	Cover estimate 2020	Cover estimate 2021	Cover estimate 2022	Cover estimate 2023	Notes 2023
Wild Oat	*Avena* sp.	12%	6%	5%	6%	11%	15%	Dominant along eastern boundary. Weed front has moved further west since last assessment.
Total weed cover in Grassland Reserve		**~ 20%**	**~ 15%**	**~ 10%**	**~ 15%**	**~ 35%**	**~ 35%**	

Notes: Grey = Weeds in the Grassland Reserve that are considered to be a priority for weed control. Green = Weeds which have reduced in cover. Orange = New emergent weeds and weeds that have maintained or increased in cover. ***** = Plant not considered a weed at time of assessment.

Spiny Rice-flower

Baseline data

Several Spiny Rice-flower (SRF) plants occur within the Grassland Reserve. As per the ongoing research being undertaken in this area by Debbie Reynolds, some plants are in cages. All SRF plants recorded during an updated targeted survey of the reserve in 2016 were tagged with metal tags/rings and have unique identification numbers.

During the November 2018 monitoring, 29 SRF plants were selected at random and notes were recorded on their status and health. Of the 29 SRF plants assessed, 25 were in good health, while two were reduced to a mass of woody stems, and the remaining two were reduced to dead material above ground.

In addition to the 29 tagged plants assessed, six SRF recruits (small plants without tags) were recorded in the north west of the reserve. These six plants are expected to be new plants that have recruited following recent biomass control burns in the reserve.

Monitoring and reporting – Year 2

179 Spiny Rice-flowers (SRF) have been recorded within the Grassland Reserve during a detailed targeted survey in 2016. All SRFs were tagged with metal tags/rings and have unique identification numbers.

During the December 2019 monitoring, all SRF plants were attempted to be located and notes were recorded on their status and health. Of the 179 SRFs assessed, 162 were re-recorded in good health, while seven were not found, and the remaining ten, only the tags were found with no plants observed. It can be assumed that these plants are either dormant or dead.

In addition to the tagged plants, 35 new SRF plants were recorded (plants without tags) throughout the reserve. Of these 35 plants, seven of them may be the remaining tagged plants which were not found, while the remaining 28 plants are small and likely to be new recruits that have emerged following management of biomass through ecological burns and weed control.

Monitoring and reporting – Year 3

Of the total of 197 plants recorded in November 2019, 106 (53.8%) were re-recorded during November 2020. The low number of re-detection has been attributed to the high cover of biomass making visual detection of the plants difficult. The majority of the recorded plants were large individuals which grew above the dense cover of grasses. When smaller plants were located, they were typically hidden beneath a dense cover of vegetation. In contrast, last year's survey was conducted after a recent prescribed burn, reducing biomass and enabling plants to be readily detected, particularly smaller individuals which were difficult to detect during the recent survey.

The low number of individuals recorded creates difficulty in accurately assessing the health of the population. In subsequent years, monitoring must be undertaken only after prescribed burns to enable optimal conditions for SRF detection, which in turn will provide a greater insight into the stability of the SRF population within the reserve. It was noted that the individuals which were found were in good health, with no dead plants observed, suggesting that the overall population of SRF is likely stable.

Monitoring and reporting – Year 4

Prior to the survey, DFC informed of an especially high biomass accumulation in the reserve. This was primarily due to excessive growth of introduced grass species in response to unusually long-term, favourable growing conditions for these threats. In order ensure visibility of Spiny Rice-flower

and therefore detection during the survey, it was recommended that slashing to above 15cm be conducted beforehand. This management action was undertaken approximately one week before the survey and resulted in a potentially more accurate assessment of the occurrence of Spiny Rice-flower in the reserve, which were in full flower at the time.

A total of 222 Spiny Rice-flower plants were recorded within the reserve during the June 2021 targeted survey. This was an increase of 25 (13%) and 116 (109%) on that found in 2020 and 2019 respectively, and included numerous young plants indicating that the species was successfully recruiting. Most of the individuals observed were in good health, except for three dead specimens located in the translocation area, however, it is likely that these were identified as failed translocations as indicated in previous surveys, as each had a marker and only rotted main stems remained suggesting that the loss was not recent.

Due to the density of plants, unstable GPS accuracy during the survey (as a result of heavily overcast, rainy conditions), and the problems with identifying individual records evident from previous survey efforts (partly from the loss of tags), no attempt was made to match observations with existing datapoints. The general distribution, however, remained similar but with clear expansion of the population into previously unestablished areas of the reserve. There was also a notable increase in the number of plants recorded in the translocation site, indicating stabilisation of the transplants and successful recruitment of this sub-population. Eighteen plants were found at this location, which is a 100% increase on then number recorded in 2020.

Monitoring and reporting – Year 5

A total of 145 Spiny Rice-flower plants were recorded within the reserve during the August 2022 targeted survey (as mapped in Figure 1), in comparison to the 106 plants recorded in 2020 and 222 in 2021. The age of plants, and therefore recruitment, could not be determined this year because plant emerging post-burn would in some cases have had the appearance of recruits. All individuals observed were in good health.

The fluctuation in numbers through the years is most likely a result of recruitment resulting in higher numbers and failure to detect due to difficulty locating individuals because of high biomass levels.

Due to the density of plants, unstable GPS accuracy during the survey, and the problems with identifying individual records evident from previous survey efforts, no attempt was made to match observations with existing datapoints. The general distribution, however, remained similar but with clear expansion of the population into previously unestablished areas of the reserve.

Monitoring and reporting – Year 6

A total of 233 Spiny Rice-flower were recorded within the reserve during the targeted survey in May 2023. This corresponded to a 60% increase from the previous year (145 individuals). Although fluctuating, population numbers appear to be stable over monitoring years with 222 plants recording in 2021, 106 in 2020 and 197 in 2019.

The observed records included numerous young plants indicating that the species was successfully recruiting. All individuals observed were in good health. The fluctuation in numbers through the years may a response to burn regimes or seasonal climate resulting in individuals remaining dormant some years or mass recruiting after fire. Furthermore, survey efforts may have affected in the eastern half of the reserve due to a high biomass of Kangaroo Grass, limiting species detection.

Prior to the survey, a controlled burn was operated in the western half of the reserve in Autumn 2022. The controlled burn was undertaken in accordance with the approved *Grassland Reserve Management Plan* (BL&A 2018). As a result, biomass levels in the western half of the Grassland

Reserve were low, revealing high exposure of inter-tussock space and therefore, visibility to detect the target species. In contrast, very low bare ground was observed on the eastern side due to a thick cover of Kangaroo Grass. This may explain variation in species found during survey efforts between the west and east section.

Due to the density of plants, unstable GPS accuracy during the survey, and the problems with identifying individual records evident from previous survey efforts (partly from the loss of tags), no attempt was made to match observations with existing datapoints. Additionally, delineation of what constitutes an individual plant can be subjective, and because the plants in the burnt area had only relatively recently begun resprouting, many that were yet to emerge may have been undetectable. The general distribution, however, remained similar but with clear expansion of the population into previously unestablished areas of the reserve.

An increase in the number of plants recorded was observed in the translocation site. Due to the stable numbers of individuals recorded in previous years, these plants have been shown to have successfully established. The lower numbers detected in this area in the previous year is either a result of a failure to detect due to high biomass levels or surface material removed by planned burns.

Biomass

Baseline data

Biomass levels in the Grassland Reserve differed based on recent burning in particular sections of the reserve. In areas of the reserve that had been recently burned, biomass was low, with large inter-tussock spaces between the dominant Kangaroo Grass. In the areas not subject to recent burning, biomass levels were high, with limited space between tussocks.

Monitoring and reporting – Year 2

Biomass levels in the Grassland Reserve differed based on recent burning in particular sections of the reserve. In the eastern half of the reserve that had been recently burnt, biomass was low, with large inter-tussock spaces between the dominant Kangaroo Grass. In areas where grass had been slashed, biomass was high. In the areas not subject to recent burning or slashing, biomass levels were moderate, with more limited space between tussocks. An overall assessment of the organic litter cover was estimated at 20%.

Monitoring and reporting – Year 3

Biomass levels in the Grassland Reserve differed across the site. In areas that had been burnt in the previous year, biomass was moderate, however in areas which had not been burnt, biomass was high. The majority of these burnt areas had moderate inter-tussock spaces between the dominant Kangaroo Grass, enabling the growth of forbs such as Spiny Rice-flower, Blue Grass-lily and Yellow Rush-lily. In the areas not subject to recent burning, biomass levels were high, with more limited space between tussocks. An overall estimate of leaf litter was 10% cover, with bare ground estimated at approximately 7% overall, and absent in some areas.

Monitoring and reporting – Year 4

Biomass levels in the Grassland Reserve were moderate and within the normal range expected of Plains Grassland vegetation. On average, biomass was higher in parts of the reserve which had not been burnt in 2019. Slashing undertaken in June 2021 had resulted in a moderate cover of leaf litter (15%) across the reserve. This, combined with the very low cover of bare ground (1%) may limit forb recruitment in the short term until litter decomposition and/or a controlled burn occurs. This slashing was undertaken at the recommendation of Nature Advisory in lieu of a controlled burn

in autumn 2021 to improve accuracy of Spiny Rice-flower population data. Controlled burns must therefore be undertaken in autumn 2022, particularly in the south-eastern corner of the reserve which was not burnt in 2019 and along the eastern boundary where weed cover is high.

Monitoring and reporting – Year 5

Biomass levels in the Grassland Reserve varied based on time elapsed since areas was burnt. On average, biomass was low within the recently burnt area (Photo 11), high in the west of the unburnt area (Photo 12) and moderate in the east of the unburnt area. The unburnt area with a high cover of biomass may limit forb recruitment.

The recent ecological burn in the western half of the site has reduced the biomass and increased inter-tussock spaces, potentially enabling the recruitment of a greater diversity of native flora species in the reserve. However, as well as promoting the regeneration of native species, it has also led to the germination establishment of introduced species: primarily annual grasses. An ecological burn should therefore be followed up with prescribed weed control for any new weeds.

Photo 11: Grass biomass in the burnt area

Photo 12: Grassland in the unburnt area where biomass is very high, predominantly due to an overabundance of Kangaroo Grass.

Monitoring and reporting – Year 6

Kangaroo Grass continues to be the dominant grass species in the reserve. Other native grasses observed include Long-hair Plume-grass, Rigid Panic and Tussock Grass. *A* diverse range of indigenous species occurred in inter-tussock spaces including Spiny Rice-flower, Smooth Rice-flower, Black-anther Flax-lily, Sheep's Burr, Grassland Wood-sorrel, Cottony Fireweed, Slender Speedwell, Common Woodruff, Varied Raspwort, and Kidney Weed.

Biomass levels had increased in the burnt area compared to 2022 levels as demonstrated by the decrease in both bare ground and inter-tussock space compared with the 2022 survey. Biomass was higher in the east in areas of high weed cover (Photo 10) and lower in the west were weed cover was lower (Photo 13).

Photo 13: Typical biomass level in the west of the grassland reserve as of October 2023

Evidence of pest animals

Baseline data

No evidence of pest animals was recorded in the grassland reserve.

Monitoring and reporting – Year 2

No evidence of pest animals was recorded in the grassland reserve. As such, no pest animal control is currently required.

Monitoring and reporting – Year 3

No evidence of pest animals was recorded in the grassland reserve. As such, no pest animal control is currently required.

Monitoring and reporting – Year 4

During the site assessment, one inactive rabbit burrow was found within the reserve. No rabbit scats were detected within the reserve. Evidence of warren ripping and the presence of rabbit scats in land adjacent to the eastern boundary of the reserve suggest that rabbits have been frequenting the locality. Rabbit proof fencing has been fixed to the bottom of the gate in the southeastern corner of the reserve to prevent rabbits from entering the site.

Monitoring and reporting – Year 5

During the site assessment, rabbit activity was detected within the reserve (Photo 14). With the integrity of the fencing intact, it is likely that rabbit-proofing measures on the gate require further review and additional mitigation measures may be required.

Photo 14: Rabbit activity within the reserve

Monitoring and reporting – Year 6

While there was evidence of substantial European Rabbit activity adjacent to the reserve no rabbit activity was detected within the reserve. Diggings were found within the Grassland Reserve; these were potentially from bush rats or similar native fauna as no rabbit scats were found, however, the high population of rabbits outside the reserve greatly increases the likelihood of access and destruction within protected areas. In November fencing around the grassland reserve was upgraded to permanent, post and wire rabbit proof fencing as part of stage 33. Quarterly rabbit and control within the entire development area will be implemented to mitigate mass population.

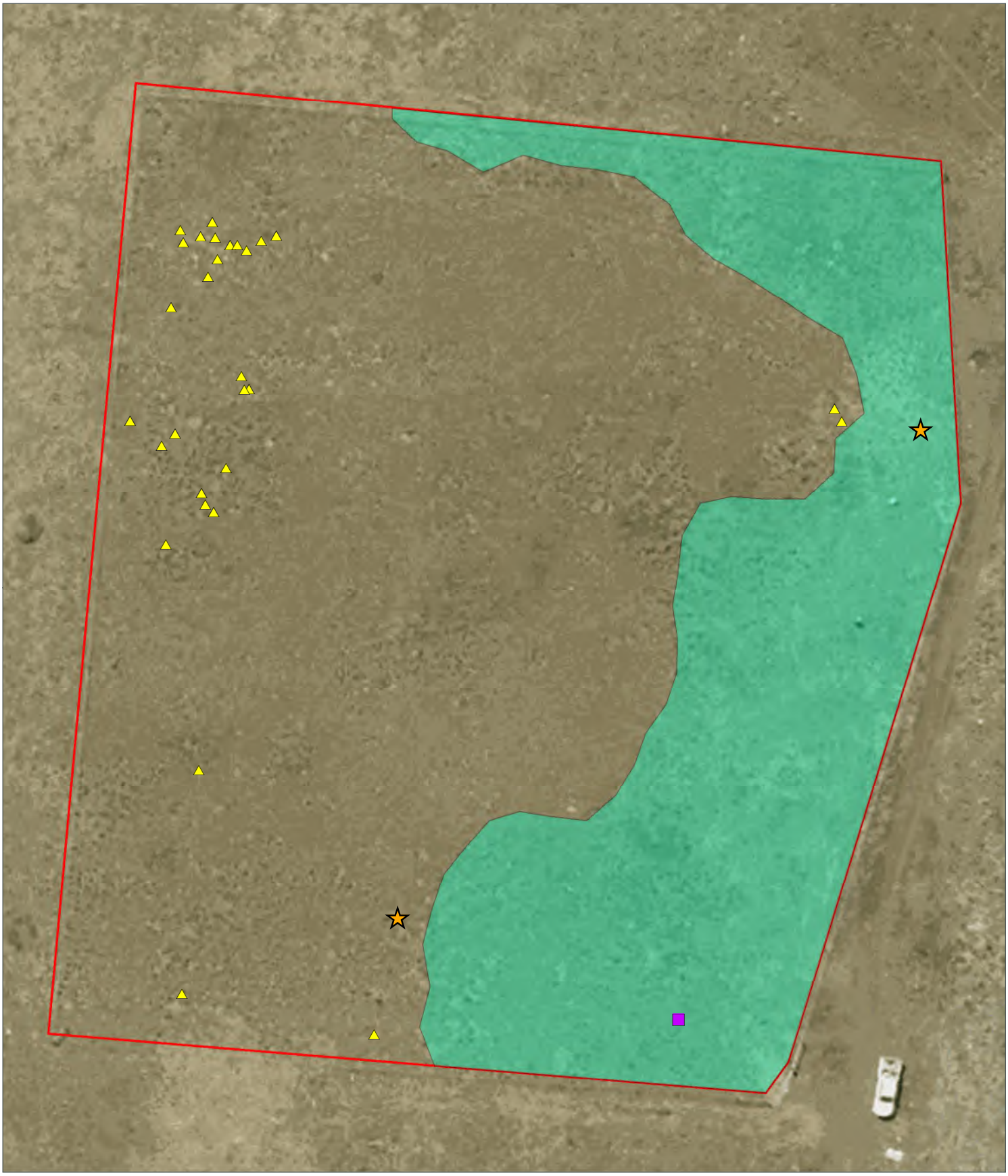

Figure 1: Threatened species and weeds within the grassland reserve

Project: Grassland Reserve Monitoring **Client**: DFC Project Management **Date**: 1/11/2023

Grassland Reserve
High weed cover
SRF Locations

Threatened species

Arching Flax-lily
Fragrant Saltbush

N

Metres
0 7.5

Nature Advisory
PO Box 337, Camberwell, VIC 3124, Australia
www.natureadvisory.com.au
03 9815 2111 - info@natureadvisory.com.au

Figure 2: Spiny Rice-flower Monitoring 2023

Project: Grassland Reserve Monitoring **Client**: DFC Project Management **Date**: 24/10/2023

Grassland Reserve

SRF locations

N

Metres

0 7.5

Nature Advisory

PO Box 337, Camberwell, VIC 3124, Australia
www.natureadvisory.com.au
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Construction and 10-year management actions

Integrity of fencing

At the time of the previous monitoring, fencing integrity around the reserve was sound and 'No-Go Zone' signage was in place at 30 metre intervals.

The Year 3 annual monitoring report recommended that the gate in the south-eastern corner be made rabbit-proof and, at the time of the October 2021 (Year 4) assessment, appropriate modifications to this gate have been made.

At the time of the October 2022 (Year 5) assessment, the integrity of the fencing, gate and signage were checked around the entire reserve and were found to be in good condition. However, the evidence of recent rabbit activity within the reserve indicates that access is still being achieved somewhere. This is most likely at the gate, suggesting the current rabbit-proofing measure requires assessment and appropriate adaptive action taken to mitigate potential impacts.

During the current Year 6 monitoring (October 2023) the integrity of the fencing, gate, and signage were checked around the entire reserve and were found to be in good condition. Observed slack in fencing adjacent to the reserve (Photo 15) has since been repaired as part of the Stage 33 development works in November. Previous years have mentioned the presence of rabbit activity within the reserve; however, these were not observed in the 2023 assessments, suggesting that appropriate adaptive action has been taken to mitigate potential impacts.

Photo 15: Permanent fencing upgrade around grassland reserve as part of stage 33.

As of October 2023 there has been an increased occurrence of litter within the reserve. The fence along the western boundary of the reserve is limiting blow in from surrounding areas and work sites, however many fragments are still scattered throughout the reserve (Photo 16. One concern in particular is the inappropriate dumping of mulch within the Grassland Reserve (Photo 16). Dumping of material from outside the reserve increases the risk of introduction of pathogens and additional weed species, which could be detrimental to the protected native vegetation within the reserve.

Since the assessment was conducted it has been reported that regular monitoring of litter has been undertaken and disposed as required.

Photo 16: Mulch pile along roadside fencing, with tampered fencing.

Sediment and surface water control

At the time of the October 2021 (Year 4) assessment, sediment fencing in Stage 21 upslope of the Grassland Reserve was appropriately installed. The October 2022 (Year 5) assessment did not add further comment.

As of October 2023, sediment fencing was only partially present around the reserve and was not present adjacent all areas of earthworks (Photo 17).

Photo 17: No sediment fencing adjacent areas of construction and earthworks.

Weed control

Weed control actions in 2021 have been undertaken in the Grassland Reserve by Australian Ecosystems, the results of which are summarised here and presented in the report in Appendix 5.

In particular, the three most prolific high-threat weeds identified in the GRMP have been drastically reduced in cover from the data collected in January 2017, as described below and detailed in Table 1.

- African Boxthorn:
    - January 2017 (GRMP) – a number of large individuals near the eastern boundary
    - November 2018 – no mature individuals observed
    - December 2019 – no mature individuals observed, small emergent plants recorded
    - November 2020 – no large individuals observed, small emergent plants recorded
    - October 2021 – no large individuals observed, medium-sized emergent plants recorded
    - October 2022 – no living individuals observed, one dead individual detected
    - October 2023 – no individuals observed
- Artichoke Thistle:
    - January 2017 (GRMP) – an infestation recorded in northern section
    - November 2018 – less than 1% cover with only a small number of recruits
    - December 2019 – no individuals observed
    - November 2020 – immature plants observed in disturbed ground
    - October 2021 – small plants observed, most of which had been recently sprayed

- October 2022 – A number of plants observed in the unburnt section, less than 1% cover
- October 2023 – A number of individuals present along eastern boundary, including new recruits

- Serrated Tussock:
  - January 2017 (GRMP) – large infestations and spreading
  - November 2018 – less than 1% cover with only a small number of individuals
  - December 2019 – no individuals observed
  - November 2020 – many immature plants observed along the southern edge (1% cover)
  - October 2021 - many plants observed near eastern and northern boundary (3% cover)
  - October 2022 – scattered throughout, with more in the unburnt area (2% cover) than burnt area (1% cover)
  - October 2023 – scattered throughout (1% cover)

Weed outbreaks previously recorded adjacent to the grassland reserve were controlled as follows:

- Fennel:
  - January 2017 (GRMP) – a large infestation of Fennel occurred immediately to the east of the reserve boundary, on the eastern side of the existing dirt track
  - November 2018 – infestation eradicated
  - December 2019 – evidence of individuals recently sprayed
  - November 2020 – no individuals observed
  - October 2021 – no individuals observed
  - October 2022 – not documented; assumed no individuals observed
  - October 2023 – no individuals observed

Revegetation

Revegetation works are not required to occur in the Grassland Reserve.

Landscape planting

Adjacent landscape plantings have not yet commenced. These will be reported on in future compliance reports.

3.9. Conditions 18, 19, 21 & 26

Conditions 18, 19, 21 & 26 read as follows:

18. The **approval holder** must ensure that **offset attributes** and **shapefiles** for all offset sites are provided to the **Department** at the timing of submitting their corresponding **offset management plan**.

19. Within 30 days after the commencement of **construction activities**, the **approval holder** must advise the **Minister** in writing of the actual date of commencement of **construction activities**.

21. Within three months of every 12-month anniversary of the commencement of **construction activities**, the **approval holder** must publish a report on its website addressing compliance with

each of the conditions of this approval, including implementation of any management plans as specified in the conditions. Documentary evidence providing proof of the date of publication and non-compliance with any of the conditions of this approval must be provided to the **Department** at the same time as the compliance report is published. Compliance reports must remain on the approval holder's website for 12 months from the date of publishing. The requirement to submit compliance reports will cease following written agreement with the **Minister**.

26. Unless otherwise agreed to in writing by the **Minister**, the **approval holder** must publish all management plans referred to in these conditions of approval on the approval holder's website. Each management plan must be published on the website within 1 month of being approved. The **approval holder** must notify the **Department** within 5 days of publishing the plan on the website. The management plans must remain on the website for the period this approval has effect.

Condition 18 compliance

Shapefiles and offset attributes of the following have been provided to the Department corresponding with the submission of each offset plan:

- Karabeal offset site – corresponding to the Project Area B Offset Management Plan (OMP) and the Project Area A1 OMP;
- Campbelltown offset site – corresponding to the Project Area B OMP; and
- Cressy offset site – corresponding to the Project Areas C1, C2 & D OMP.

Condition 19 compliance

The proponent advised the Minister in writing within 30 days of the commencement of construction, commencing 9th October 2017. Evidence of this is provided in Appendix 4.

Condition 21 compliance

As required in the written advice from the Department (Appendix 4) this Compliance Report is to be published on the approval holder's website before 9th January 2022.

Condition 26 compliance

All management plans relating to construction activities that have commenced are published on the approval holder's website at https://www.denniscorp.com.au/about-dennis-family/initiatives-and-awards/sustainability.

End of Year 6 Compliance Report

Appendix 1: Approval 2011/6063 – Consolidated Variation Notice dated 9/11/2018

Australian Government
Department of the Environment and Energy

VARIATION OF CONDITIONS ATTACHED TO APPROVAL
Burnside Development – The Point, Victoria (EPBC 2011/6063)

This decision to vary conditions of approval is made under section 143 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

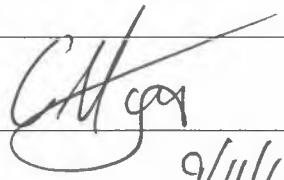
Approved action

Person to whom the approval is granted	DFC (Project Management) Pty Ltd ABN: 83 161 448 139
Approved action	To develop Modeina Estate Precinct 2, a residential housing development in the Melbourne suburb of Burnside, Victoria [see EPBC Act referral 2011/6063 and variation to proposal dated 26 March 2015].

Variation

Variation of conditions attached to approval	The variations are: Revoke conditions 9, 10, 11 and 12. Delete conditions 13, 14, 15, 16,17 and Appendix A attached to the approval dated 20 July 2015 and substitute with the conditions specified below. Add Appendix B, condition 14A and definitions for 'Grassland Reserve' and 'Grassland Reserve Management Plan' as specified below.
Date of effect	This variation has effect on the date the instrument is signed

Person authorised to make decision

Name and position	Greg Manning Assistant Secretary Assessments (WA, SA, NT) & Post Approvals Branch
Signature	
Date of decision	9/11/18

Date of decision	Conditions attached to approval
Original approval dated 20/07/2015	To minimise impacts of the action on listed threatened species and ecological communities: 1. The **approval holder** must ensure that **construction activities** do not occur outside of the **project area** as illustrated at Appendix A.
Original approval dated 20/07/2015	2. The **approval holder** must implement sediment and erosion control measures consistent with **best practice pollution, sediment and erosion control guideline(s)** for the duration of **construction activities**.
Original approval dated 20/07/2015	3. The **approval holder** must prepare a site specific **Growling Grass Frog** Management Plan; which is required to be consistent with **best practice Growling Grass Frog management guidelines**. The plan must outline how significant impacts to **Growling Grass Frogs** will be avoided or mitigated and as a minimum must include: a. Management measures demonstrating how the **Growling Grass Frog buffer zone** will be demarcated to minimise vehicle access; b. Details of revegetation, **environmental weed** control measures and other management activities within the **Growling Grass Frog buffer zone**; c. Details of any **construction activities** and management measures to avoid **significant impacts** during construction; and d. Measures to ensure any on-site personnel will be informed of their obligations under the **Growling Grass Frog** Management Plan.
Variation dated 04/08/2017	4. **Construction activities** must not commence in **Project Areas A1, A2, C1, C2** and **D** until the site specific **Growing Grass Frog** Management Plan has been approved by the **Minister** in writing. Construction in **Project Area B** can proceed prior to approval of the site-specific **Growing Grass Frog** Management Plan must be implemented.
Variation dated 04/08/2017	*Project Area A1 and A2* 5. The **approval holder** must ensure that the action does not impact more than eleven (11) individual **Spiny Rice-flower** plants within the combined area of **Project Areas A1** and **A2.**
Variation dated 04/08/2017	6. The approval holder must not commence **construction activities** in **Project Area A1** until the following are met: a. A direct offset, consistent with the **EPBC Act Environmental Offsets Policy**, has been secured to compensate for the impacts to 6.053 hectares of **NTGVVP** and 6.053 hectares of **Striped Legless Lizard habitat**; i. An **offset management plan** has been prepared and submitted to the **Minister** for approval, and the **approval holder** has received written confirmation that the **offset management plan** has been approved. The approved **offset management plan** must be implemented by the **approval holder**; and ii. The **Department** has been provided with written confirmation and supporting evidence demonstrating that the offset has been secured.
Variation dated 04/08/2017	6A. The approval holder must not commence **construction activities** in **Project Area A2** until either 6A(a) or 6A(b) are met: a. A direct offset, consistent with the **EPBC Act Environmental Offsets Policy**, has been secured to compensate for the impacts to

Date of decision	Conditions attached to approval
	4.277 hectares of **NTGVVP** and 4.277 hectares of **Striped Legless Lizard habitat**; i. An **offset management plan** has been prepared and submitted to the **Minister** for approval, and the **approval holder** has received written confirmation that the **offset management plan** has been approved. The approved **offset management plan** must be implemented by the **approval holder**; and ii. The **Department** has been provided with written confirmation and supporting evidence demonstrating that the offset has been secured; OR b. In a manner consistent with the **Melbourne Urban Development Policy**, secure an offset for impacts to 4.277 hectares of **NTGVVP** and 4.277 hectares of **Striped Legless Lizard habitat** associated with **Project Area A2**. Documentary evidence that the offset has been secured must be provided to the **Department** with 14 days of being secured.
Variation dated 04/08/2017	*Project Area B* 7. The **approval holder** must not commence **construction activities** in **Project Area B** until either 7(a) or 7(b) are met: a. A direct offset containing a minimum of 100 **Spiny Rice-flower** plants has been secured; i. An **offset management plan** has been prepared and submitted to the **Minister** for approval, and the **approval holder** has received written confirmation that the **offset management plan** has been approved. The approved **offset management plan** must be implemented by the **approval holder**; and ii. The **Department** has been provided with written confirmation and supporting evidence that demonstrate the offset has been secured; OR b. The **Minister** agrees in writing that condition 15 (a–e) has been satisfied.
Variation dated 04/08/2017	8. The **approval holder** must not commence **construction activities** in **Project Area B** until the following are met: a. A direct offset, consistent with the **EPBC Act Environmental Offsets Policy**, has been secured to compensate for the impacts to 1.824 hectares of **NTGVVP** and 1.824 hectares of **Striped Legless Lizard habitat**; i. An **offset management plan** has been prepared and submitted to the **Minister** for approval, and the **approval holder** has received written confirmation that the **offset management plan** has been approved. The approved **offset management plan** must be implemented by the **approval holder**; and ii. The **Department** has been provided with written confirmation and supporting evidence that demonstrate the offset has been secured.
As varied on the date this instrument was signed	9. Revoked
As varied on the date this instrument was signed	10. Revoked

Date of decision	Conditions attached to approval
As varied on the date this instrument was signed	11. Revoked
As varied on the date this instrument was signed	12. Revoked
As varied on the date this instrument was signed	*Project Area C1, C2 and D* 13. The **approval holder** must not commence **construction activities** in **Project Area C2** until the following are met. a. A direct offset, consistent with the **EPBC Act Environmental Offsets Policy**, has been secured to compensate for the impacts to 3.283 hectares of **NTGVVP** and 3.283 hectares of **Striped Legless Lizard habitat**; i. An **offset management plan** has been prepared and submitted to the **Minister** for approval, and the **approval holder** has received written confirmation that the **offset management plan** has been approved. The approved **offset management plan** must be implemented by the **approval holder**; and ii. The **Department** has been provided with written confirmation and supporting evidence that demonstrate the offset has been secured. b. A direct offset is secured containing a minimum of 60 **Spiny Rice-flower** plants. An **offset management plan** must be prepared and submitted to the **Minister** for approval. The approved **offset management plan** must then be implemented by the **approval holder**.
As varied on the date this instrument was signed	14. The **approval holder** must not undertake construction activities within the **Grassland Reserve**, to be located in **Project Area D** as per Appendix B.
As added on the date this instrument was signed	14A. The **approval holder** must, in consultation with a **suitably qualified ecologist**, develop a **Grassland Reserve Management Plan** for the protection and management of **protected matters** within the **Grassland Reserve**. The **Grassland Reserve Management Plan** must be submitted to the **Minister** for approval 6 months prior to the commencement of **construction activities** within 100 metres of **Project Area D**. The approved **Grassland Reserve Management Plan** must be implemented. The **Grassland Reserve Management Plan** must: a. include existing baseline data and other supporting evidence that documents the baseline conditions of **protected matters** within the **Grassland Reserve**; b. outline specific management actions to protect and maintain **protected matters** within the **Grassland Reserve** ; and c. outline annual monitoring and reporting on the condition of **protected matters** within the **Grassland Reserve** for a period of 10 years from commencement of the Plan.
As varied on the date this instrument was signed	15. The **approval holder** must not commence **construction activities** within **Project Area D and Project Area C1** until the **Minister** agrees in writing that the following are met: a. A **suitably qualified ecologist** has confirmed in writing that each transplant site is demonstrating recruitment by propagated plants;

Date of decision	Conditions attached to approval
	b. A **suitably qualified ecologist** has prepared a report to peer review the results of the **Spiny Rice-flower Propagation Project**; c. The **approval holder** has submitted the peer review report to the **Minister** for review; and d. The **Minister** has reviewed the report and determined it demonstrates the **Spiny Rice-flower Propagation Project** has resulted in a **viable and self sustaining Spiny Rice-flower** population at each transplant recipient site, and supports the **target number** of **established Spiny Rice-flower** plants across the sites; Note: Condition 15e was revoked on the date this instrument was signed.
As varied on the date this instrument was signed	16. The **approval holder** must not commence **construction activities** in **Project Area D** until the following are met. a. A direct offset, consistent with the **EPBC Act Environmental Offsets Policy**, has been secured to compensate for the impacts to 3.963 hectares of **NTGVVP** and 3.963 hectares of Striped Legless Lizard habitat; i. An **offset management plan** has been prepared and submitted to the **Minister** for approval, and the **approval holder** has received written confirmation that the **offset management plan** has been approved. The approved **offset management plan** must be implemented by the **approval holder**; and ii. The **Department** has been provided with written confirmation and supporting evidence that demonstrate the offset has been secured. b. Condition 15 has been satisfied.
As varied on the date this instrument was signed	17. If condition 15 (a–d) cannot be met in full: a. the **approval holder** must not commence **construction activities** within **Project Area D** and **Project Area C1**; until the following are met: i. Adequately compensate for impacts to **Spiny Rice-flower** plants located within **Project Area D** and **Project Area C1** with an alternative offset. This offset strategy must be prepared following consultation with the **Department**; and ii. The **Minister** has provided written notification to the **approval holder** that condition 15 no longer applies Note: Condition 17b was revoked on the date this instrument was signed.
Original approval dated 20/07/2015	*Administrative Conditions* 18. The **approval holder** must ensure that **offset attributes** and **shapefiles** for all offset sites are provided to the **Department** at the timing of submitting their corresponding **offset management plan**.
Original approval dated 20/07/2015	19. Within 30 days after the commencement of **construction activities**, the **approval holder** must advise the **Minister** in writing of the actual date of commencement of **construction activities**.
Original approval	20. The **approval holder** must maintain accurate records substantiating all activities associated with or relevant to the conditions of approval,

Date of decision	Conditions attached to approval	
dated 20/07/2015		including measures taken to implement the management plans, and make them available upon request to the **Department**. Such records may be subject to audit by the **Department** or an independent auditor in accordance with section 458 of the **EPBC Act**, or used to verify compliance with the conditions of approval. Summaries of audits will be posted on the **Department's** website. The results of audits may also be publicised through the general media.
Original approval dated 20/07/2015	21.	Within three months of every 12 month anniversary of the commencement of **construction activities**, the **approval holder** must publish a report on its website addressing compliance with each of the conditions of this approval, including implementation of any management plans as specified in the conditions. Documentary evidence providing proof of the date of publication and non-compliance with any of the conditions of this approval must be provided to the **Department** at the same time as the compliance report is published. Compliance reports must remain on the approval holder's website for 12 months from the date of publishing. The requirement to submit compliance reports will cease following written agreement with the **Minister**.
Original approval dated 20/07/2015	22.	Upon the direction of the **Minister**, the **approval holder** must ensure that an independent audit of compliance with the conditions of approval is conducted and a report submitted to the **Minister**. The independent auditor must be approved by the **Minister** prior to the commencement of the audit. Audit criteria must be agreed to by the **Minister** and the audit report must address the criteria to the satisfaction of the **Minister**.
Variation dated 04/08/2017	23.	If the **approval holder** wishes to carry out any activity otherwise than in accordance with management plans as specified in the conditions, the **approval holder** must submit to the **Department** for the **Minister's** written approval a revised version of that management plan. The varied activity shall not commence until the **Minister** has approved the revised management plan in writing. The **Minister** will not approve a revised management plan unless the revised management plan will result in an equivalent or improved environmental outcome over time. If the **Minister** approves the revised management plan, then it must be implemented in place of the management plan originally approved.
Original approval dated 20/07/2015	24.	If the **Minister** believes that it is necessary or convenient for the better protection of listed threatened species and ecological communities to do so, the **Minister** may request that the **approval holder** make specified revisions to the management plans specified in the conditions and submit the revised management plan for the **Minister's** written approval. The **approval holder** must comply with any such request. The revised approved management plans must be implemented. Unless the **Minister** has approved the revised management plans then the **approval holder** must continue to implement the management plan originally approved, as specified in the conditions.
Original approval dated 20/07/2015	25.	If, at any time after 5 years from the date of this approval, the **approval holder** has not **substantially commenced** the action, then the **approval holder** must not **substantially commence** the action without the written agreement of the **Minister**.
Original approval	26.	Unless otherwise agreed to in writing by the **Minister**, the **approval holder** must publish all management plans referred to in these conditions of approval on the approval holder's website. Each management plan

Date of decision	Conditions attached to approval
dated 20/07/2015	must be published on the website within 1 month of being approved. The **approval holder** must notify the **Department** within 5 days of publishing the plan on the website. The management plans must remain on the website for the period this approval has effect.

Date of decision	Definitions attached to approval
Original approval dated 20/07/2015	**Approval holder** - the person undertaking the action who holds the project approval.
Original approval dated 20/07/2015	**Best practice Growling Grass Frog management guidelines** - these include the most recent versions of *Guidelines for managing the endangered Growling Grass Frog in urbanising landscapes (Victorian Department of Sustainability and Environment, 2010)*, *Procedure statement for translocation of threatened native vertebrate fauna in Victoria (Victorian Department of Sustainability and Environment, 2013)*, *Bellarine Peninsula Ramsar Site Strategic Management Plan (DEPI, 2003)*, *Urban Stormwater Best Practice Environmental Management Guidelines (CSIRO, 1999)*, Constructed Wetlands Guidelines (Victorian Government and Melbourne Water Corporation, 2010) and *Water Sensitive Urban Design Guidelines (Victorian Government and Melbourne Water Corporation, 2013)*.
Original approval dated 20/07/2015	**Best practice pollution, sediment and erosion control guidelines** - the most recent version of relevant guidelines on pollution, sediment and erosion control, such as the *Construction Techniques for Sediment Pollution Control (EPA Publication No. 275, 1991)*; and *Environmental Guidelines for Major Construction Sites (EPA Publication No. 480, 1996).*
Original approval dated 20/07/2015	**Construction activities** - includes but is not limited to clearing of vegetation, the erection of any onsite temporary structures and the use of heavy duty equipment for the purpose of breaking the ground for infrastructure or earthworks. This does not include maintenance or use of existing access tracks, erection or construction of **security fencing** and signage, or investigative activities such as accessing the site for surveying or planning purposes.
Original approval dated 20/07/2015	**Department** - the Australian Government Department administering the ***EPBC Act***.
Original approval dated 20/07/2015	**Environmental Management Plan** - the document developed by a **suitably qualified ecologist** to the satisfaction of the **Department**, detailing the long-term management of **protected maters** within **Project Area D** and **Project Area C1**.
Original approval dated 20/07/2015	**Environmental weeds** - invasive native and non-native plants including: i listed Victorian Declared Noxious Weeds, including Artichoke Thistle *(Cynara cardunculus),* Fennel (*Foeniculum vulgare)* and Spiny Rush(*Juncus acutus)*; ii. listed Victorian Invasive Plants, including Mirror Bush (*Coprosma repens),* Pampas grass (*Cortaderia sp.),* Italian buckthorn (*Rhamnus alaternus*) and Spartina/Cord Grass (*Spartina anglica* and *Spartina* x *townsendii)*; and

Date of decision	Definitions attached to approval
	iii. listed Weeds of National Significance, including Madeira vine (*Anredera cordifolia*), Asparagus weeds / Bridal Creeper (*Asparagus aethiopicus, A. africanus, A. asparagoides, A. asparagoides Western Cape form, A. declinatus, A. plumosus, A. Scandens* [excluding *A. Officinalis and A. Racemosus*]), Brooms including Flax-leaf Broom (*Cytisus scoparius, Genista monspessulana* and *G. linifolia,*), African boxthorn (*Lycium ferocissimum*), Chilean needle grass (*Nassella neesiana*), Serrated tussock (*Nassella trichotoma*), Blackberry (*Rubus fruticosus agg.),* Silverleaf nightshade (*Solanum elaeagnifolium*), Willows (*Salix spp.* [excluding *S. Babylonica*, *S. Calodendron* and *S. reichardtii*]), Gorse (*Ulex europaeus*).
Original approval dated 20/07/2015	**EPBC Act** - the *Environment Protection and Biodiversity Conservation Act 1999* (Cth)
Original approval dated 20/07/2015	**EPBC Act Environmental Offsets Policy** - the Australian Government policy document titled: *EPBC Act environmental offsets policy, Department of the Environment, 2013 Policy guiding the use of offsets under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).*
Original approval dated 20/07/2015	**Established Spiny Rice-flower** – A Spiny-Rice flower plant that meets the following: i. was introduced into the area through the **Spiny Rice-flower Propagation Project**; and ii. is at least 2 years old.
As added on the date this instrument was signed	**Grassland Reserve** – the area of **NTGVVP** within **Project Area D** set aside as a permanent reserve, identified in Appendix B.
As added on the date this instrument was signed	**Grassland Reserve Management Plan** - specific management plan for the Grassland Reserve.
Original approval dated 20/07/2015	**Growling Grass Frog** – the frog species *Litoria raniformis,* protected under the **EPBC Act.**
Original approval dated 20/07/2015	**Growling Grass Frog buffer zone** - the area identified as Growling Grass Frog Buffer in Appendix A.
Original approval dated 20/07/2015	**Melbourne Urban Development Policy** - the document *Policy Statement for Melbourne urban development proposals needing consideration under Parts 7, 8 and 9 of the EPBC Act*, Department of the Environment, February 2014, online: http://www.environment.gov.au/system/files/resources/dc154fd1-d526-4e7d-9a8e-bd17f8ceac15/files/melbourne-urban-development_1.pdf
Original approval dated 20/07/2015	**Minister** - the Australian Government Minister administering the *EPBC Act* and includes a delegate of the Minister.
Original approval dated 20/07/2015	**NTGVVP** – is the threatened ecological community *Natural Temperate Grassland of the Victorian Volcanic Plain,* protected under the **EPBC Act.**

Date of decision	Definitions attached to approval
Original approval dated 20/07/2015	**Offset attributes –** an '.xls' file capturing relevant attributes of the offset site, including the EPBC reference ID number, the physical address of the offset site, coordinates of the boundary points in decimal degrees, the EPBC Act protected matters that the offset compensates for, any additional EPBC Act protected matters that are benefiting from the offset, and the size of the offset in hectares.
Original approval dated 20/07/2015	**Offset management plan** - an offset management plan must: • include baseline information for the offset site(s); • include details of how the offset(s) are consistent with the **EPBC Act Environmental Offsets Policy**; • demonstrates how the offset site(s) will be protected for long term conservation purposes; • include details of short and long term management measures, include timeframes for management measures for the site(s); • and identify the short and long term arrangements and responsibilities of parties in the management of the site(s).
Variation dated 04/08/2017	**Project Area A1** - the area identified as Project Area A1 in Appendix A.
Variation dated 04/08/2017	**Project Area A2** - the area identified as Project Area A2 in Appendix A.
Original approval dated 20/07/2015	**Project Area B –** the area identified as Project Area B in Appendix A.
Original approval dated 20/07/2015	**Project Area C1 –** the area identified as Project Area C1 in Appendix A.
Original approval dated 20/07/2015	**Project Area C2** – the area identified as Project Area C2 in Appendix A.
Original approval dated 20/07/2015	**Project Area D** – the area identified as Project Area D in Appendix A.
Original approval dated 20/07/2015	**Project area** – the area contained within the Proposed Residential Stage Boundaries, identified by a dashed red line in Appendix A.
Original approval dated 20/07/2015	**Protected matters** – **NTGVVP, Spiny Rice-flower, Striped Legless Lizard** and **Growling Grass Frog.**
Original approval dated 20/07/2015	**Security fencing** - a fence with locked gated access that prevents access by the public, while allowing dispersal of **Striped Legless Lizard.**
Original approval dated 20/07/2015	**Shapefile -** an ESRI Shapefile containing '.shp', '.shx' and '.dbf' files and other files capturing attributes including at least the EPBC reference ID number and EPBC protected matters present at the relevant site. Attributes should also be captured in '.xls' format.
Original approval dated 20/07/2015	**Significant impact -** as described in Significant Impact Guidelines 1.1 – Matter of National Environmental Significance (Department of the Environment, 2013) and any specific significant impact guidelines.
Original approval dated 20/07/2015	**Spiny Rice-flower -** the plant species *Pimelea spinescens subsp. spinescens*, protected under the **EPBC Act**.

Date of decision	Definitions attached to approval
Original approval dated 20/07/2015	**Spiny Rice-flower Propogation Project** - refers to the Spiny Rice-flower Propagation Project prepared by BL&A 2013.
Original approval dated 20/07/2015	**Striped Legless Lizard** - the lizard species *Delma impar*, protected under the **EPBC Act**
Original approval dated 20/07/2015	**Striped Legless Lizard habitat** - is any grassland (exotic and native) that may be utilised by the **Striped Legless Lizard** for breeding, sheltering, foraging or ranging.
Original approval dated 20/07/2015	**Substantially commenced** - means the installation of any permanent infrastructure associated with the action.
Original approval dated 20/07/2015	**Suitably qualified ecologist** - a person with relevant tertiary qualifications in ecology, botany or environmental science and at least 5 years of experience in surveying and field work relevant to the relevant **Protected Matter**, or any other person agreed to in writing by the **Department.**
Original approval dated 20/07/2015	**Target number** - refers to the target total of 800 individual plants as set out in the **Spiny Rice Flower Propagation Project**. In the event the person taking the action secures direct offsets for **Spiny Rice-flower** to compensate for impacts in the **project area**, the target number will be reduced on a 1:1 basis following written confirmation from the **Minister.**
Original approval dated 20/07/2015	**Trust for Nature** - meaning the organisation Trust for Nature (http://www.trustfornature.org.au/).
Original approval dated 20/07/2015	**Viable and self-sustaining** - means that the specified **Spiny Rice-flower** population demonstrates: i. Numbers of annually flowering male and female plants in proportions similar to that in natural populations; ii. That new germinants are recruiting in numbers similar to that in natural populations; and iii. A growing population where recruitment exceeds mortality to a similar extent as other managed populations

Date of decision	**Appendix A**
As varied on the date this instrument was signed	Modeina Estate Stage Development Plan, showing boundaries of **Project Areas A1, A2, B, C1, C**2 and **D**

Date of decision	**Appendix B**
As added on the date this instrument was signed	Grassland Reserve, located within **Project Area D**

APPENDIX A

DENNIS FAMILY CORPORATION

MODEINA

Stage Comparison Plan

Concept Plan

Precinct 2

LEGEND:

Precinct 2
65.49ha

- Growling Grass Frog Habitat 35m from centreline of Kororoit Creek
- Existing Sewerage and or Drainage Easements
- Retained Native Vegetation
- Spiny Rice Flowers
- Spiny Rice Flowers to be Retained
- Growling Grass Frog Buffer
- Reserve
- Project Areas
- Grassland Reserve
- Project Area A1
- Project Area A2
- Project Area B
- Project Area C1
- Project Area C2
- Project Area D

0 100 200

scale 1:2500 @ A1

DATE: 28 June 2018
REF: 29743 001
DWG: 2974300ZC

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i. Numbers of annually flowering male and female plants in proportions similar to that in natural populations;

ii. That new germinants are recruiting in numbers similar to that in natural populations; and

iii. A growing population where recruitment exceeds mortality to a similar extent as other managed populations.

Legend

- Precinct 2
- Grassland Reserve
- NTGVVP
- Spiny Rice-flower

Metres
0 15 30 60

Modeina Precinct 2 - Grassland Reserve		
Project: Modeina Estate		
Client: DFC (Project Management) Pty Ltd		
Project No.: 7045	**Date: 14/06/2018**	**Created By: N. May / M. Wright**

BL&A Brett Lane & Associates Pty Ltd
Experience Knowledge Solutions
Suite 5, 61 - 63 Camberwell Road
Hawthorn East, VIC 3123
PO Box 337, Camberwell, VIC 3124, Australia
Ph (03) 9815 2111 / Fax (03) 9815 2605
enquiries@ecologicalresearch.com.au
www.ecologicalresearch.com.au

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APPENDIX B

Appendix 2: Growling Grass Frog monitoring report – Year 6

Appendix 3: Written notification that Condition 15 no longer applies

From: Ruth Crabb <email address redacted >
Sent: Wednesday, 28 November 2018 11:11 AM
To: Tess Trewin < email address redacted >
Cc: Hagen Ganahl < email address redacted >
Subject: RE: EPBC 2011/6063 Burnside Development Modeina [SEC=UNCLASSIFIED]

Hi Tess,

Thank you for your email, and apologies for the delay in responding.

Condition 17 of EPBC approval 2011/6063 is intended to apply if condition 15 cannot be met in full. The Alternative Offset Strategy approved on 9 November 2018 sets out adequate compensation for impacts to Spiny Rice-Flower plants within Project Areas C1 and D, through the provision of direct offsets within the Cressy offset property. The Offset Management Plan for the Cressy property was also approved on 9 November 2018, and contains the necessary direct environmental offsets for impacts within Project Areas C1, C2 and D.

It is the Department's view that condition 17 is satisfied by the attached approval letter, as the Alternative Offset Strategy and Cressy Offset Management Plan for Project Areas C1, C2 and D would not have been approved against this condition had DFC not tabled the inability to meet the requirements of condition 15 in terms of the Spiny Rice-Flower Propagation Project.

I have also spoken with the Office of Compliance regarding this matter, and they have recommended that you retain and attach this email to your annual compliance report so that documentation is obvious.

Kind regards,

Ruth Crabb
Senior Project Officer
Post Approvals Section
Assessments (WA, SA, NT) and Post Approvals Branch
Environment Standards Division
Department of the Environment and Energy

Appendix 4: Acknowledgement of commencement of action

Australian Government
Department of the Environment and Energy

Our reference: 2011/6063

Contact Officer: Keith Horwood
Telephone: (02) 6274 1933
Email: epbcmonitoring@environment.gov.au

Mr Mal Wright
Senior Ecologist
Brett Lane & Associates Pty Ltd
PO Box 337
CAMBERWELL VIC 3124

Dear Mr Wright

Commencement of the Action, Burnside Development – The Point, VIC, EPBC 2011/6063

I am writing to you about the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) approval 2011/6063.

In accordance with the condition 19, you were required to notify the Department of the action's commencement date. Thank you for notifying the Department that the action commenced on 9 October 2017. Because the action commenced on this date, please complete the following tasks in accordance with the approval conditions by the mentioned due dates.

Condition 21 - Annual Compliance Report

The Annual Compliance Report for the period 9 October 2017 to 8 October 2018 must be published and submitted to the Department before 9 January 2019. The Annual Compliance Report must continue to be published and submitted to the Department until the expiry of the project 31 February 2035.

Please email the Annual Compliance Report, and the details of its publication, to epbcmonitoring@environment.gov.au

Please maintain accurate records of all activities associated with, or relevant to, the approval conditions so that they can be made available to the Department on request. These documents may be subject to audit and be used to verify compliance. Summaries of audits may be published by the Department.

For information about the Monitoring and Audit program, see the Department's website at http://www.environment.gov.au/topics/about-us/legislation/environment-protection-and-biodiversity-conservation-act-1999/complian-2

If you would like to discuss this matter further, please contact Keith Horwood on (02) 6274 1933.

Yours sincerely

Shonelle Meagher
Assistant Director
Environmental Audit Section
Office of Compliance

13 October 2017

Appendix 5: 2023 Australian Ecosystems weed survey reports

Weed Survey Report

Modeina Estate - Phase 2 -

June 2023

Submitted by Adam Gallagher

Australian Ecosystems Pty Ltd

Phone: 0429 453 396

Email: adamg@australianecosystems.com.au

Contents

1.0 Introduction

Australian Ecosystems (AE) has prepared this report for Dennis Family Corporation (Project Management) Pty Ltd. This report details the results of weed surveys conducted in June 2023 within the area described as 'Stage 2 Modeina'. This report should be read in conjunction with, 'Modeina Weed Management Strategy' that Greening Australia prepared in 2017.

2.0 Weeds Surveyed

This survey has captured these weed species listed below:

- African Boxthorn *(Lycium ferocissimum)*
- Artichoke Thistle (*Cynara cardunculus)*
- Spear Thistle *(Cirsium vulgare)*
- Bridal Creeper *(Asparagus asparagodies)*
- Cape weed (*Arctotheca calendula)*
- Century Plant *(Agave Americana)*
- Fennel *(Foeniculum vulgare)*
- Galenia *(Galenia pubescens)*
- Horehound *(Marrubim vulgare)*
- Paterson's Curse *(Echium plantagineum)*
- Prickly Pear *(Opuntia spp.)*
- Sweet Briar *(Rosa rubiginosa)*
- Chilean Needle Grass *Nassella neesiana)*
- Toowoomba canary grass *(Phalaris aquatica)*
- Serrated Tussock *(Nassella trichotoma)*

Determined by:

The weeds detailed within this report have been taken from the Modeina Weed Management Strategy that Greening Australia prepared in 2017. Only species that are widespread and/or have a high level of risk have been chosen to be controlled within these areas.

3.0 Survey Methodology

The above-mentioned species were surveyed using the Random Quadrant Sampling Method. Within each zone, four quadrants 5-meter X 5-meter were used to measure the current number of weed species present and then converted to a percentage cover. The results from these quadrants were then extrapolated to obtain a percentage cover across each of the zones. The results of these surveys are displayed over the following pages of the report.

3.1 Woody weeds

For this survey woody weeds are classified as African Boxthorn *(Lycium ferocissimum)*, Century Plant *(Agave Americana),* Fennel *(Foeniculum vulgare),* Prickly Pear *(Opuntia spp.)* and Sweet Briar *(Rosa rubiginosa)*.

All species had an extremely low abundance across all zones, hence these species were individually counted, and each individual was given a percentage cover value of 2%, to allow for the maximum projected canopy that they can reach once mature. It should be noted that those observed were generally still in their juvenile stage, with a projected canopy cover of much less than 2% of 25m^2. Zone 3 had a small cluster of Prickly Pear *(Opuntia spp.).* In zone 4 there were a couple of patches of Century Plant *(Agave Americana)*

3.2 Herbs and Grass Weeds

Herb and grass weeds are reduced across all zones. These weeds include Artichoke Thistle (*Cynara cardunculus)*, Scotch Thistle *(Onopordum acanthium),* Spear Thistle *(Cirsium vulgare),* Bridal Creeper *(Asparagus asparagodies),* Cape weed (*Arctotheca calendula),* Galenia *(Galenia pubescens),* Horehound *(Marrubim vulgare),* Paterson's Curse *(Echium plantagineum),* Chilean Needle Grass *Nassella neesiana),* Toowoomba canary grass *(Phalaris aquatica)* and Serrated Tussock *(Nassella trichotoma).* There are still some large pockets of Toowoomba canary grass *(Phalaris aquatic),* but this also is reducing in numbers and will be reduced even further during further maintenance visits.

3.3 Changes

Civil construction has continued within the development zone. As previously mentioned, this has reduced the area surveyed by approximately 60%. Works have been completed along the edge (roadside) of Zone 3 which has reduced the area by about 50% and along the road edge in Zone 2 also reduced the area by 50%. These planned works do not affect the survey result of this or any previous survey.

4.0 Details of Surveyed Weeds

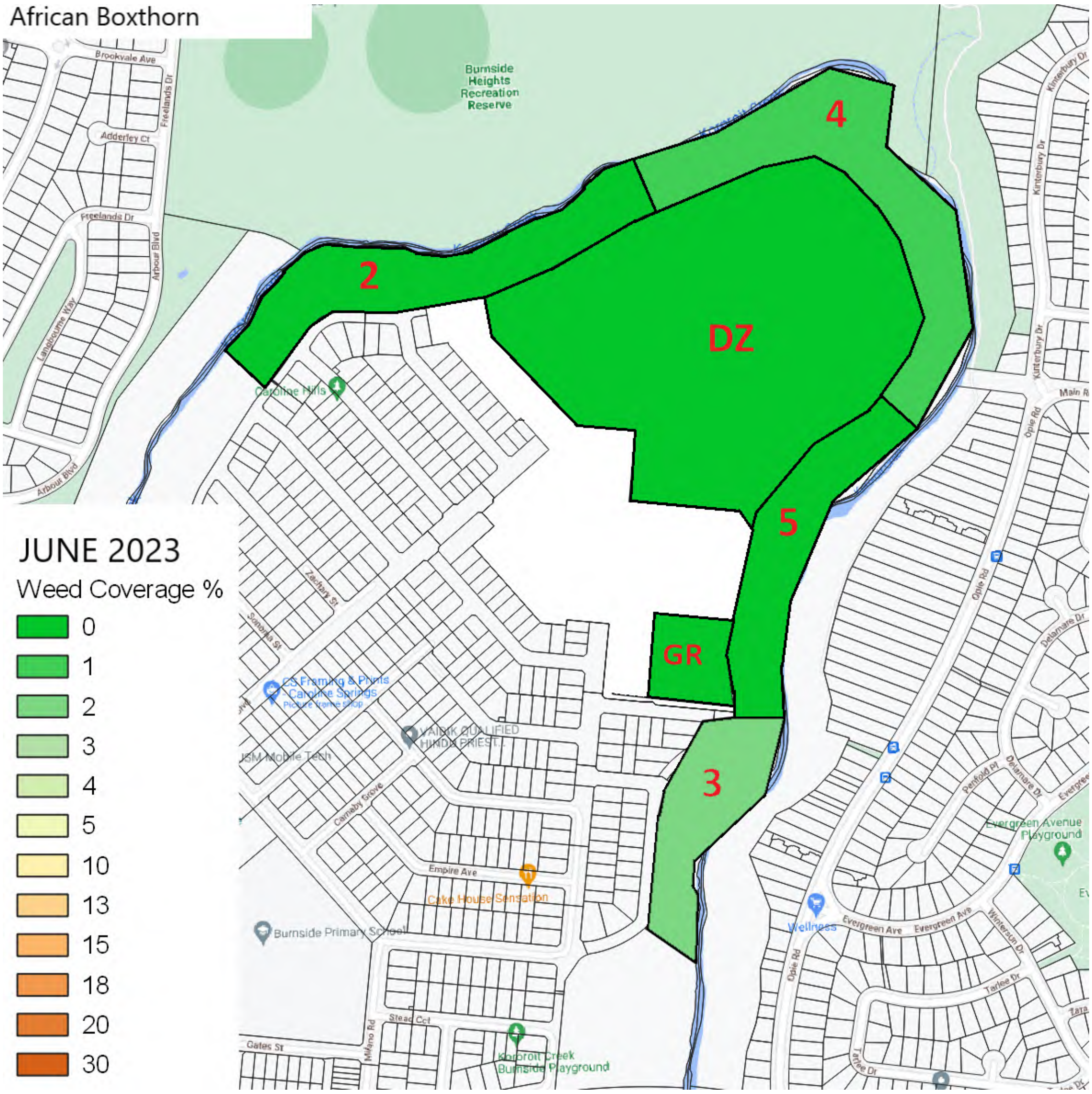
4.1 African Boxthorn - Lycium ferocissimum

Regionally Controlled & Weed of National Significance **Target coverage <1%**

Current coverage

Mgt Zone	2	4	5	3	DZ
June 2023	**0%**	**1%**	**0%**	**2%**	**0%**
March 2023	0%	0%	0%	2%	2%
September 2022	0%	0%	0%	1%	1%
June 2022	0%	0%	0%	1%	1%
March 2022	0%	1%	0%	0%	1%
December 2021	0%	0%	0%	0%	1%
October 2021	0%	0%	0%	0%	1%
August 2021	1%	1%	1%	1%	2%
April 2021	1%	1%	1%	1%	1%
Dec 2020	0%	1%	1%	0%	1%
Oct 2020	0%	1%	1%	0%	1%
June 2020	0%	1%	1%	0%	1%
April 2020	0%	1%	1%	0%	1%
Dec 2019	0%	1%	1%	0%	1%

African boxthorn is a rounded, woody, densely branched and very thorny large shrub up to 5 metres high. African boxthorn reproduces exclusively by seed, which is commonly eaten by birds, seed is viable when excreted. These plants are often found near places where birds have perched such as trees, poles, and powerlines. It was widely planted as a hedge plant before its weedy potential was realised. Spread also occurs from contaminated produce and materials. African boxthorn is a fast-growing invasive species that, if untreated, spreads quickly. Seeds may germinate year-round and early root growth is rapid, ensuring young plants are competitive. Plants take at least two years to flower, producing flowers and fruit mostly in summer. Some flowering and fruit production occurs at other times of year. Sometimes deciduous in winter, with new leaves and active growth in spring. Broken roots and cut stumps can sprout regrowth.


African Boxthorn
JUNE 2023
Weed Coverage %
0
1
2
3
4
5
10
13
15
18
20
30
2
4
DZ
5
GR
3
Burnside Heights Recreation Reserve

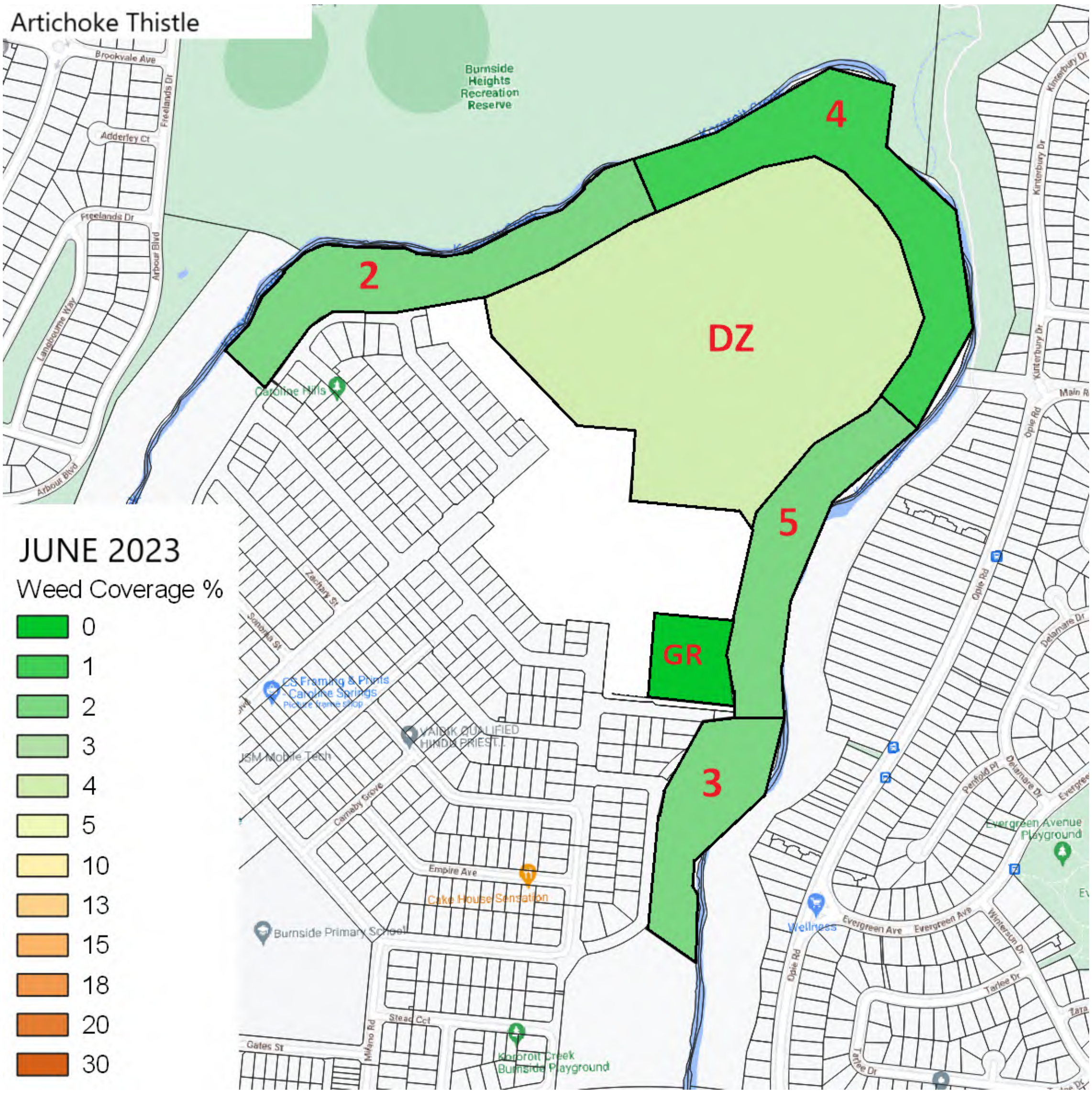
4.2 Artichoke Thistle - Cynara cardunculus

Regionally Controlled **Target coverage < 5%**

Current coverage

Mgt Zone	2	4	5	3	DZ
June 2023	**2%**	**1%**	**2%**	**2%**	**4%**
March 2023	3%	1%	0%	3%	4%
September 2022	1%	0%	0%	1%	4%
June 2022	1%	0%	0%	1%	10%
March 2022	2%	0%	0%	2%	2%
December 2021	0%	0%	0%	0%	5%
October 2021	0%	0%	0%	0%	10%
August 2021	5%	2%	15%	15%	10%
Apr 2021	15%	2%	2%	2%	5%
Dec 2020	5%	2%	5%	2%	5%
Oct 2020	5%	5%	2%	2%	10%
June 2020	2%	10%	5%	5%	10%
April 2020	25%	20%	15%	20%	20%
Dec 2019	10%	15%	15%	5%	15%

A perennial or biennial spiny thistle with annual tops and a cluster of large bright purple flowers that are 5-8 cm in diameter during summer. The mature plant is erect, with stems 1- 2 m tall arising from a bushy rosette up to 2 m wide and tall. The stem is strongly ribbed and covered with downy grey hairs and usually single at the base and branched towards the top. The large, grey green leaves are deeply lobed and spiny with woolly hairs underneath.


Artichoke Thistle
Burnside Heights Recreation Reserve
2
4
DZ
5
GR
3
JUNE 2023
Weed Coverage %
0
1
2
3
4
5
10
13
15
18
20
30

4.4 Spear Thistle - Cirsium vulgare

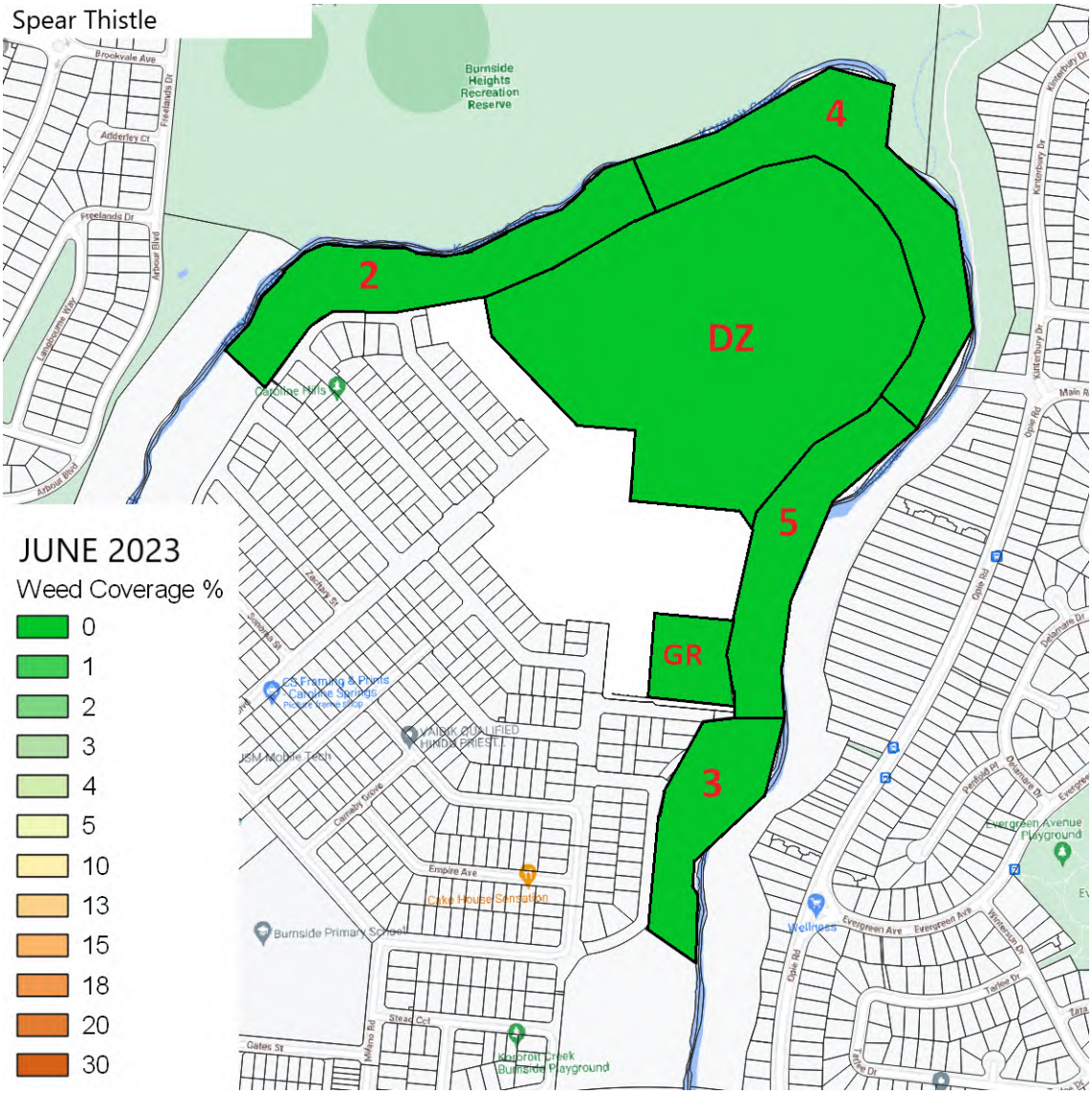
Regionally Controlled Weeds ***Target coverage <5%***

Current coverage

Mgt Zone	2	4	5	3	DZ
June 2023	**0%**	**0%**	**0%**	**0%**	**0%**
March 2023	0%	0%	0%	0%	0%
September 2022	0%	0%	0%	0%	0%
June 2022	0%	0%	0%	0%	0%
March 2022	0%	0%	0%	0%	0%
December 2021	0%	0%	0%	0%	0%
October 2021	0%	0%	0%	0%	0%
August 2021	0%	0%	0%	0%	0%
Apr 2021	0%	0%	0%	0%	0%
Dec 2020	1%	0%	0%	0%	1%
Oct 2020	1%	0%	0%	0%	1%
June 2020	1%	0%	0%	0%	1%
April 2020	1%	0%	0%	0%	1%
Dec 2019	2%	5%	1%	1%	1%

An annual or short-term perennial herb with erect growth to 1.5 m tall. Stems have spiny wings and are cobwebby. Upper leaf surface is dark green and rough while the lower surface is white with short, matted hairs.

A common species of wet or summer-moist land, including swamps, depressions, drains, wasteland, pastures, and cultivated soils. Prefers open, non-shaded environments, heavy textured soils, and good fertility.


Spear Thistle
Burnside Heights Recreation Reserve
4
2
DZ
5
GR
3
JUNE 2023
Weed Coverage %
0
1
2
3
4
5
10
13
15
18
20
30
Burnside Primary School
Cake House Sensation
Evergreen Avenue Playground
Wellness
Knoyroft Creek Burnside Playground

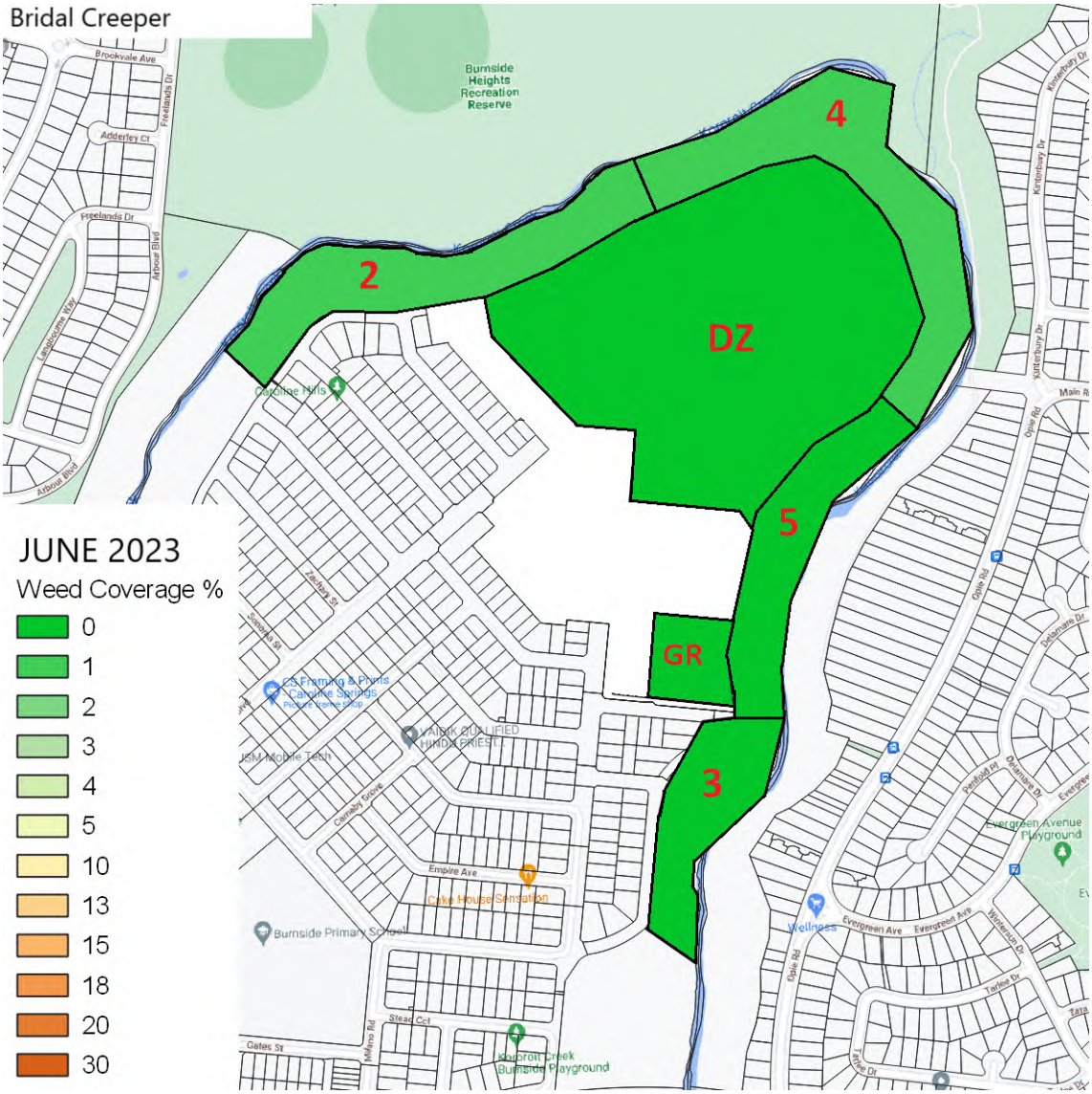
4.5 Bridal Creeper - Asparagus asparagodies

Regionally Controlled - Weed of National Significance **Target coverage < 1%**

Current Coverage

Mgt Zone	2	4	5	3	DZ
June 2023	**1%**	**1%**	**0%**	**0%**	**0%**
March 2023	1%	1%	0%	0%	0%
September 2022	1%	1%	0%	0%	0%
June 2022	1%	1%	0%	0%	0%
March 2022	2%	1%	0%	0%	0%
December 2021	2%	2%	2%	0%	0%
October 2021	3%	3%	2%	0%	0%
August 2021	5%	4%	3%	0%	0%
Apr 2021	1%	1%	1%	0%	0%
Dec 2020	0%	1%	1%	0%	0%
Oct 2020	0%	0%	1%	0%	0%
June 2020	0%	0%	1%	0%	0%
April 2020	0%	0%	1%	0%	0%
Dec 2019	0%	0%	0%	0%	0%

It is regarded as one of the worst weeds in Australia because of its invasiveness, potential for spread, and economic and environmental impacts. Bridal creeper entered the country as a garden plant and is now a major weed of bushland in southern Australia, where its climbing stems and foliage smother native plants. It forms a thick mat of underground tubers which impedes the root growth of other plants and often prevents seedling establishment. Rare native plants, such as the rice flower *Pimelea spinescens*, are threatened with extinction by Bridal Creeper.


Bridal Creeper
Burnside Heights Recreation Reserve
4
2
DZ
5
GR
3
JUNE 2023
Weed Coverage %
0
1
2
3
4
5
10
13
15
18
20
30
Burnside Primary School
Cake House Sensation
Evergreen Avenue Playground
Wellness
Burnside Playground

4.6 Cape weed - Arctotheca calendula

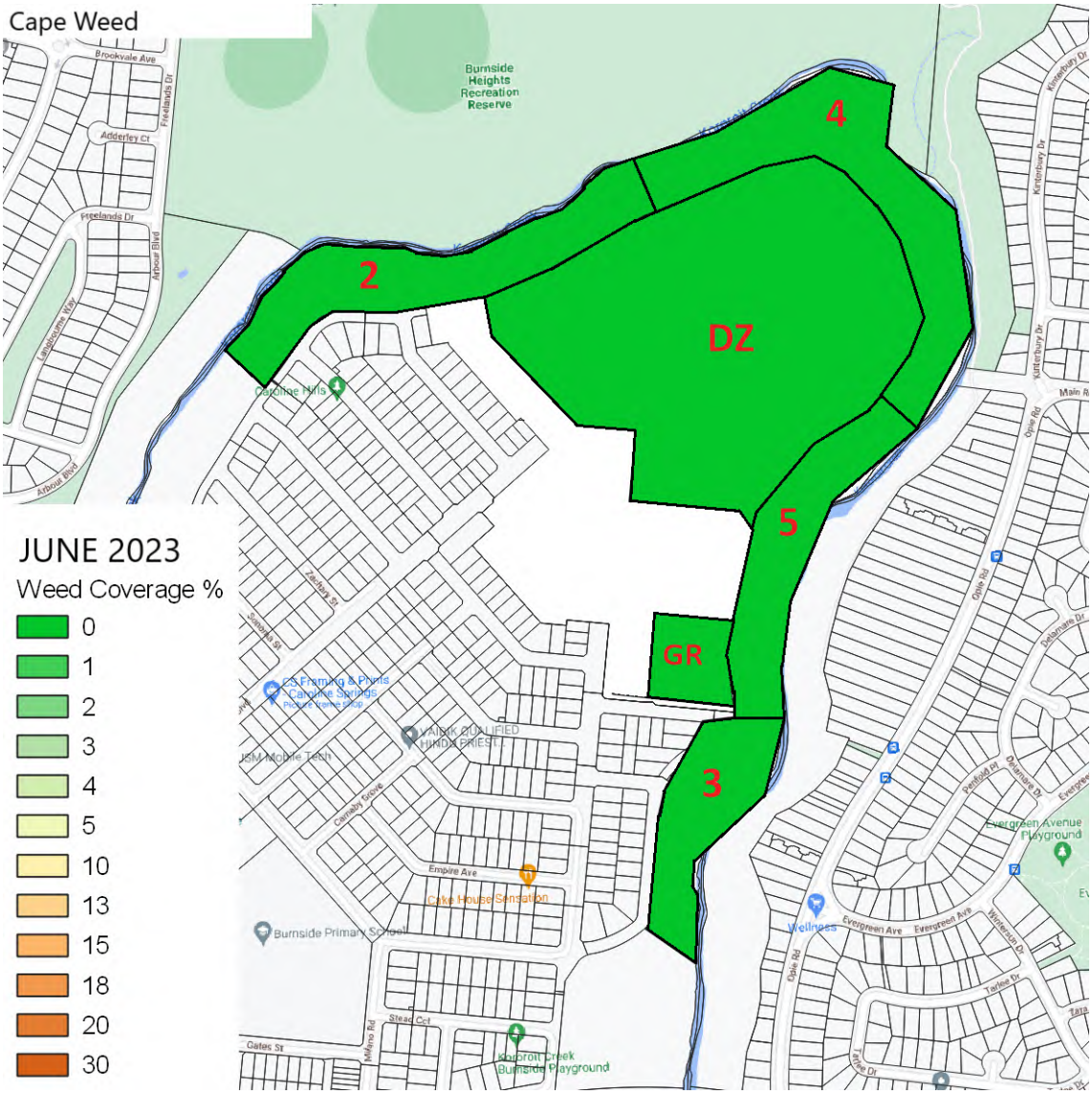
Not declared or considered noxious **Target coverage < 5%**

Current Coverage

Mgt Zone	2	4	5	3	DZ
June 2023	**0%**	**0%**	**0%**	**0%**	**0%**
March 2023	0%	0%	0%	0%	0%
September 2022	0%	0%	0%	0%	0%
June 2022	0%	0%	0%	0%	0%
March 2022	0%	0%	0%	2%	2%
December 2021	0%	0%	0%	0%	0%
October 2021	0%	0%	0%	0%	0%
August 2021	0%	0%	0%	0%	0%
Apr 2021	0%	0%	0%	0%	0%
Dec 2020	0%	0%	0%	0%	0%
Oct 2020	0%	1%	1%	1%	0%
June 2020	2%	2%	0%	2%	0%
April 2020	2%	2%	1%	2%	0%
Dec 2020	2%	2%	1%	2%	0%

This plant is widespread and common weed in pastures, lawns, cultivation, and waste areas across Victoria. Typically, a plant of fresh-water habitats but may occur on the fringes of saline swamps and flats during wetter periods.

It is stemless or shortly stemmed, herb, 80 cm wide and 30 cm high, with a taproot and a basal rosette of leaves. Leaves are 5-25 cm long and 2-6 cm wide.


Cape Weed
Burnside Heights Recreation Reserve
4
2
DZ
5
GR
3
JUNE 2023
Weed Coverage %
0
1
2
3
4
5
10
13
15
18
20
30
Burnside Primary School
Cake House Sensation
Evergreen Avenue Playground
Burnside Playground

4.7 Century Plant - Agave americana

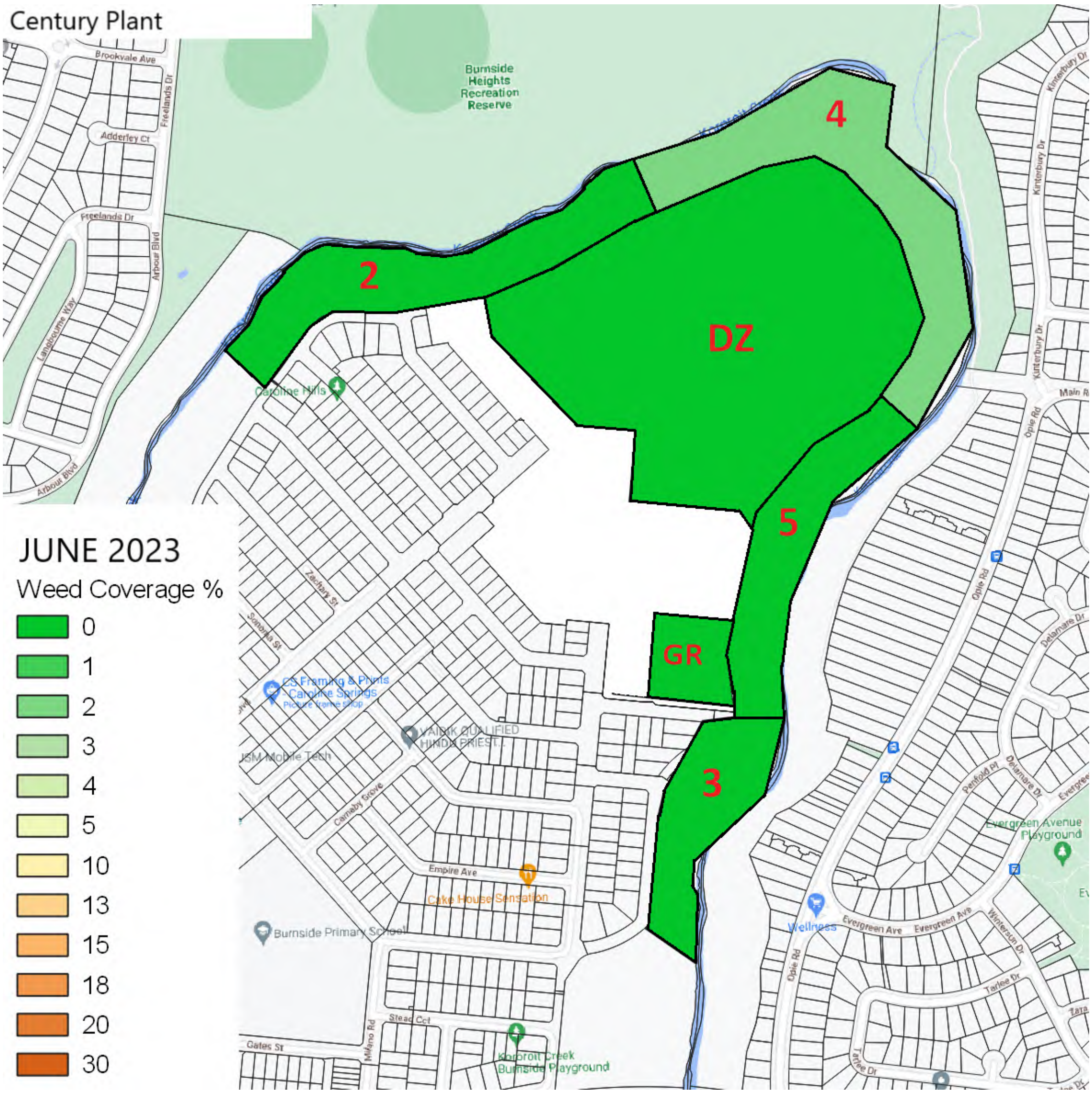
Not declared or considered noxious **Target coverage < 1%**

Current Coverage

Mgt Zone	2	4	5	3	DZ
June 2023	**0%**	**2%**	**0%**	**0%**	**0%**
March 2023	0%	2%	0%	0%	0%
September 2022	0%	1%	0%	0%	0%
June 2022	1%	0%	0%	0%	0%
March 2022	0%	0%	0%	0%	0%
December 2021	0%	0%	0%	0%	0%
October 2021	0%	0%	0%	0%	0%
August 2021	0%	0%	0%	0%	0%
Apr 2021	1%	0%	0%	0%	0%
Dec 2020	1%	0%	0%	0%	0%
Oct 2020	1%	0%	0%	0%	0%
June 2020	1%	0%	0%	0%	0%
April 2020	1%	0%	0%	0%	0%
Dec 2019	1%	0%	0%	0%	0%

A very large and long-lived rosette-forming plant, growing 1-2 m high and 2-4 m across.

Older individuals may sometimes develop a short woody stem at the base of the plant and commonly produces numerous suckers which form a large clump or colony. When fully mature this plant will develops a massive flower cluster on a robust flowering stem 6-12 m tall.



Century Plant
JUNE 2023
Weed Coverage %
0
1
2
3
4
5
10
13
15
18
20
30
2
4
DZ
5
GR
3
Burnside Heights Recreation Reserve

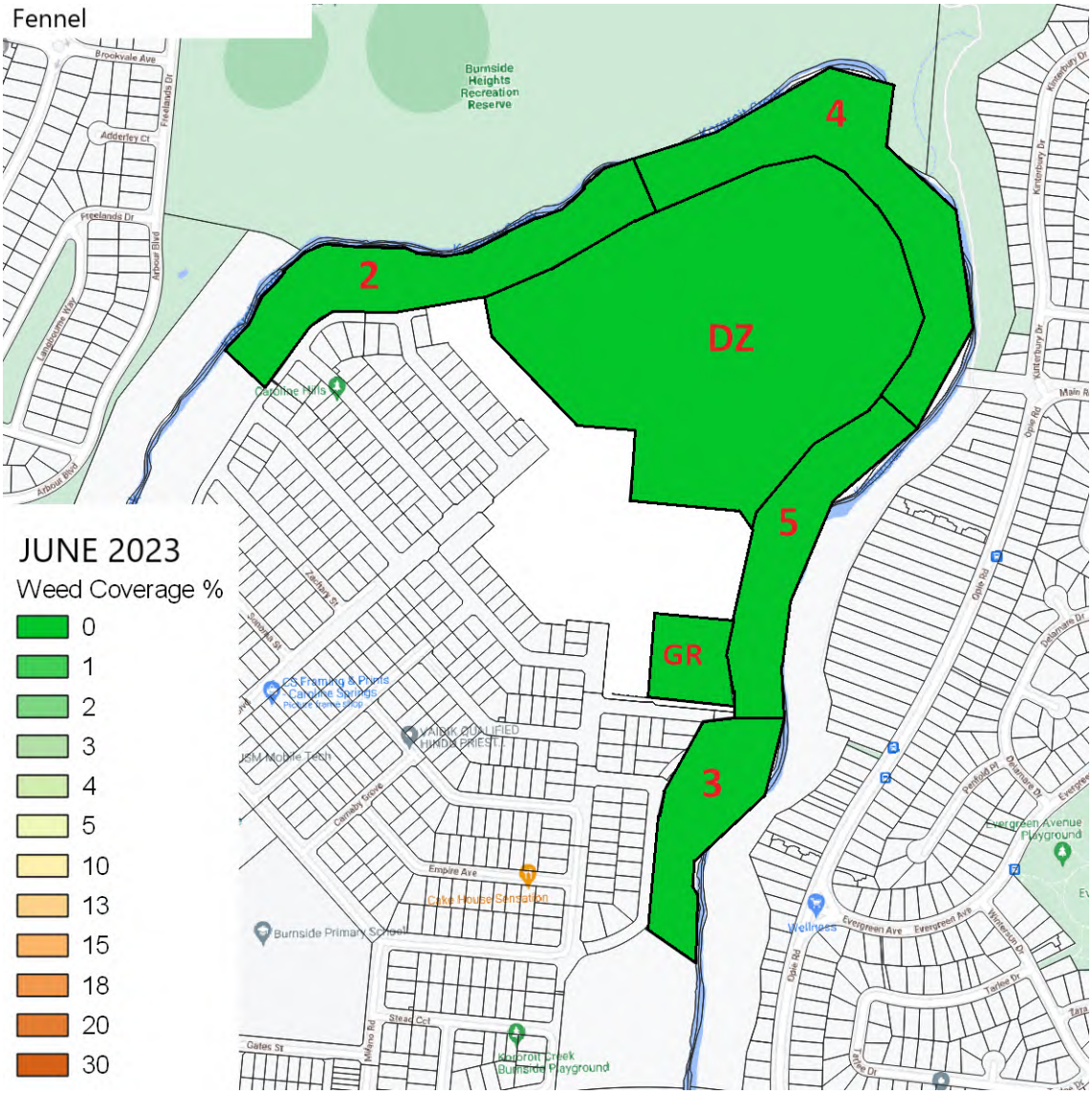
4.8 Fennel - Foeniculum vulgare

Restricted Weeds **noxious** **Target coverage < 1%**

Current Coverage

Mgt Zone	2	4	5	3	DZ
June 2023	**0%**	**0%**	**0%**	**0%**	**0%**
March 2023	0%	0%	0%	0%	0%
September 2022	0%	0%	0%	0%	0%
June 2022	0%	0%	0%	0%	0%
March 2022	0%	0%	0%	0%	0%
December 2021	0%	0%	0%	0%	0%
October 2021	0%	0%	0%	0%	0%
August	0%	0%	0%	0%	0%
Apr 2021	0%	0%	0%	0%	0%
Dec 2020	1%	0%	0%	1%	0%
Oct 2020	0%	0%	0%	0%	0%
June 2020	0%	0%	0%	0%	0%
April 2020	0%	0%	0%	0%	0%
Dec 2019	0%	1%	1%	1%	0%

An erect multi-stemmed perennial herb commonly 1.5 to 2.0 metres high. It is found along waterways, drainage lines and in seasonally moist locations within grasslands and woodlands. Dense infestations may restrict access to waterways. A soft, herbaceous plant the high growth of the plant may be a nuisance to people.


Fennel
Burnside Heights Recreation Reserve
4
2
DZ
5
GR
3
JUNE 2023
Weed Coverage %
0
1
2
3
4
5
10
13
15
18
20
30
Burnside Primary School
Cake House Sensation
Wellness
Evergreen Avenue Playground
Burnside Playground

4.9 Galenia - Galenia pubescens

Not declared or considered noxious **Target coverage < 5%**

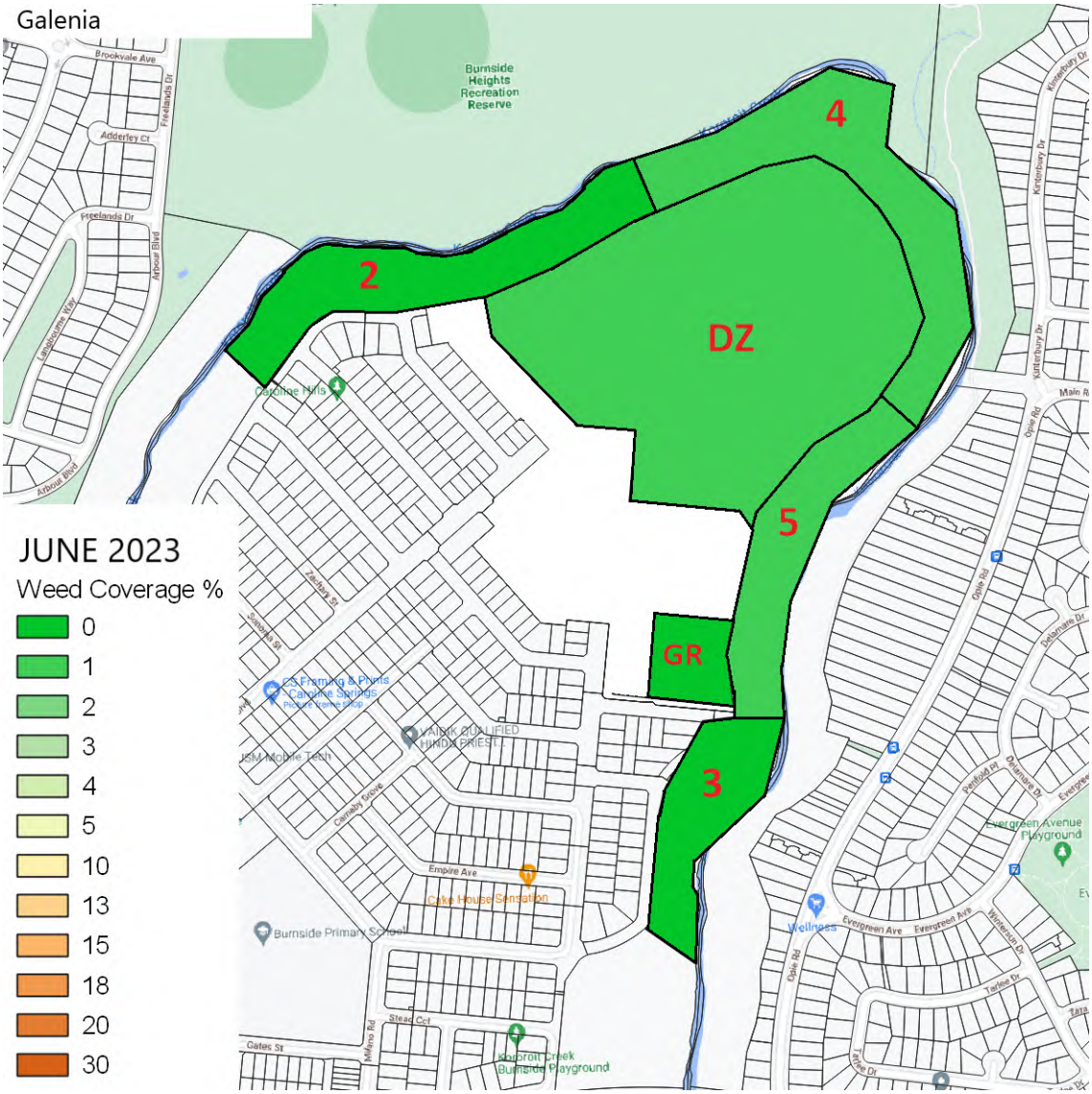
Current Coverage

Mgt Zone	2	4	5	3	DZ
June 2023	**0%**	**1%**	**1%**	**0%**	**1%**
March 2023	1%	0%	1%	0%	1%
September 2022	1%	0%	1%	0%	1%
June 2022	1%	0%	1%	0%	2%
March 2022	2%	0%	1%	1%	4%
December 2021	1%	1%	1%	1%	5%
October 2021	1%	1%	1%	1%	10%
August 2021	1%	1%	1%	1%	0%
Apr 2021	1%	1%	1%	1%	0%
Dec 2020	1%	1%	0%	1%	0%
Oct 2020	0%	0%	0%	1%	0%
June 2020	1%	0%	1%	0%	0%
April 2020	1%	0%	0%	1%	0%
Dec 2019	2%	1%	1%	1%	1%

This perennial creeping, herbaceous plant growing to about 60 cm high and 1–2 m wide.

It is deep rooted and flowers from late spring to early autumn. Galenia reproduces by seed. Most dispersal of seed occurs by wind, water, birds and livestock. Movement of contaminated soil by vehicles and equipment can also contribute to its spread.

Drought and salt tolerant, galenia grows over and smothers existing vegetation by forming a thick dense mat. It invades coastal dunes, pastures, disturbed areas, lawns, roadsides and rocky outcrop vegetation. Galenia is known to produce nitrates that can be toxic to stock.


Galenia
Burnside Heights Recreation Reserve
4
2
DZ
5
GR
3
JUNE 2023
Weed Coverage %
0
1
2
3
4
5
10
13
15
18
20
30

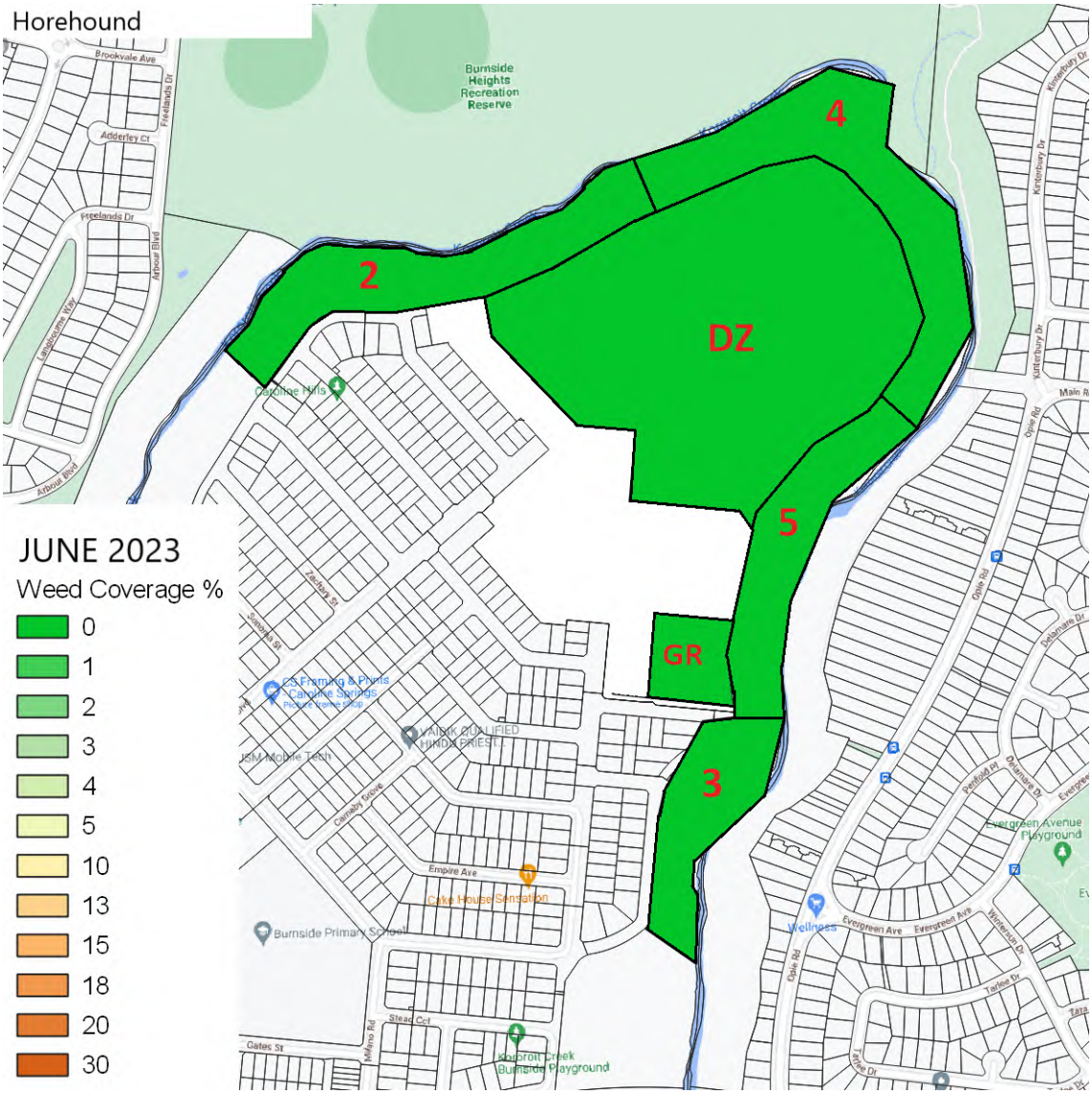
4.10 Horehound - Marrubim vulgare

Not declared or considered noxious **Target coverage <5%**

Current Coverage

Mgt Zone	2	4	5	3	DZ
June 2023	**0%**	**0%**	**0%**	**0%**	**0%**
March 2023	1%	0%	0%	0%	0%
September 2022	1%	0%	0%	0%	0%
June 2022	1%	0%	0%	0%	0%
March 2022	0%	1%	1%	0%	0%
December 2021	0%	0%	0%	0%	0%
October 2021	0%	1%	0%	4%	3%
August 2021	0%	1%	0%	1%	0%
Apr 2021	0%	1%	0%	1%	0%
Dec 2020	0%	1%	1%	1%	0%
Oct 2020	1%	0%	1%	0%	0%
June 2020	0%	1%	0%	1%	0%
April 2020	0%	1%	1%	0%	0%
Dec 2019	0%	0%	0%	0%	0%

A bushy perennial plant, 30 to 80 cm high, sharply aromatic when crushed, covered with dense whitish hairs. Horehound thrives on poor soil and in waste places. It invades poor pastures which provide little competition. Horehound contains a bitter alkaloid which makes it unpalatable for grazing livestock. As well as being an agricultural weed of pastures horehound has become an important environmental weed because of its ability to invade disturbed native vegetation.


Horehound
Burnside Heights Recreation Reserve
4
2
DZ
5
GR
3
JUNE 2023
Weed Coverage %
0
1
2
3
4
5
10
13
15
18
20
30
Burnside Primary School
Cake House Sensation
Wellness
Evergreen Avenue Playground
Burnside Playground

4.11 Paterson's Curse - Echium plantagineum

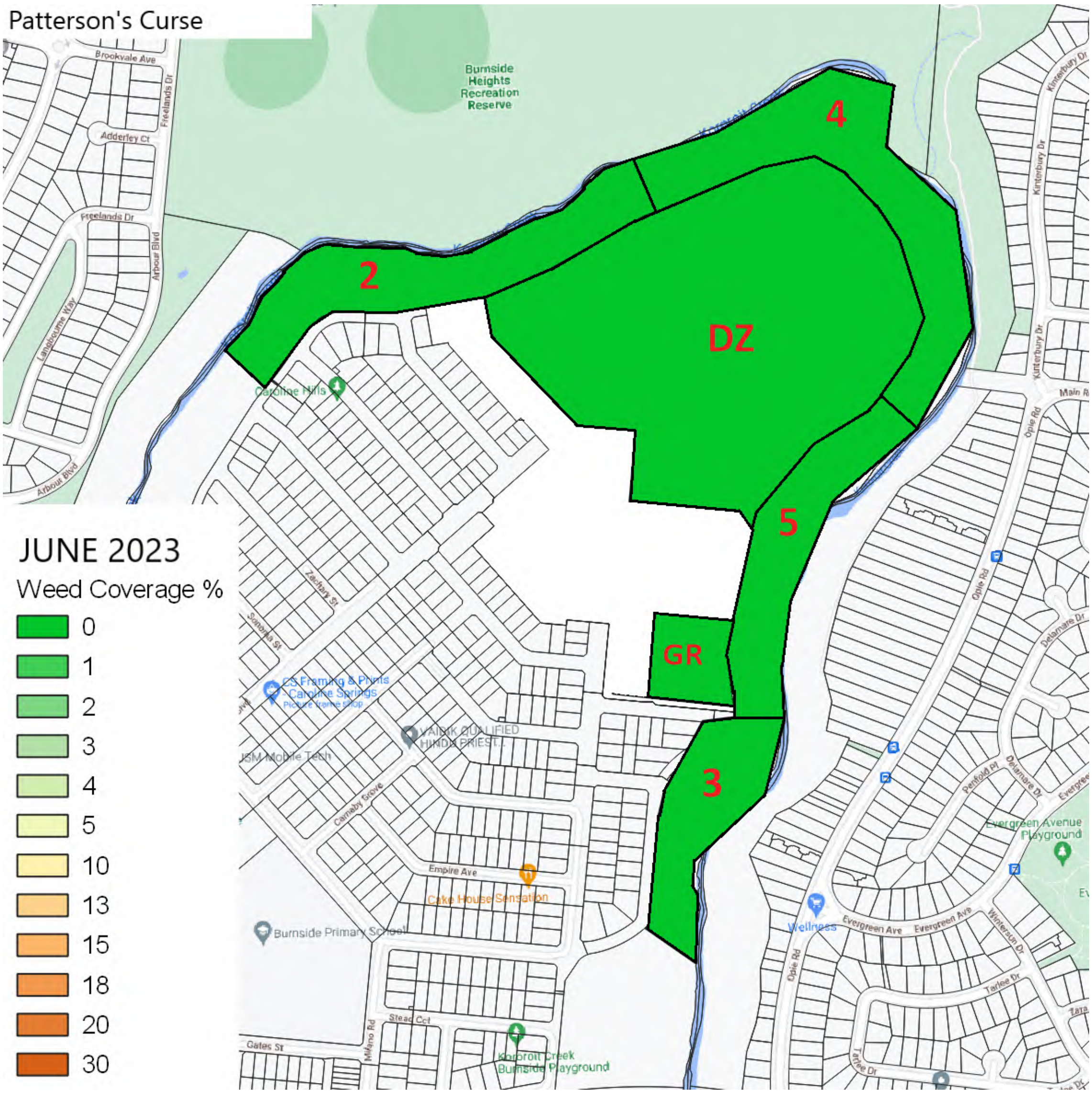
Regionally controlled **Target coverage < 5%**

Current Coverage

Mgt Zone	2	4	5	3	DZ
June 2023	**0%**	**0%**	**0%**	**0%**	**0%**
March 2023	0%	0%	0%	0%	0%
September 2022	0%	0%	0%	0%	0%
June 2022	0%	0%	0%	0%	0%
March 2022	2%	0%	0%	2%	2%
December 2021	0%	0%	0%	0%	0%
October 2021	0%	0%	0%	0%	10%
August 2021	0%	0%	0%	2%	10%
Apr 2021	0%	0%	0%	0%	0%
Dec 2020	1%	1%	1%	1%	2%
Oct 2020	2%	1%	1%	2%	2%
June 2020	2%	2%	5%	5%	5%
April 2020	5%	10%	5%	5%	10%
Dec 2019	5%	1%	2%	2%	2%

Paterson's curse is an annual, occasionally biennial, herb that grows as a rosette in autumn and winter and produces flowering stalks in spring and early summer. The rosette usually grows parallel to the ground; however, the leaves may be erect in dense vegetation.

Plants begin to produce flowering stalks in late winter, commence flowering in early spring and die in summer. The flowers are usually purple but may be blue or pink. The first mature seeds are produced four to six weeks after flowering commences.


Patterson's Curse
Burnside Heights Recreation Reserve
2
4
DZ
5
GR
3
JUNE 2023
Weed Coverage %
0
1
2
3
4
5
10
13
15
18
20
30

4.12 Prickly Pear - Opuntia spp.

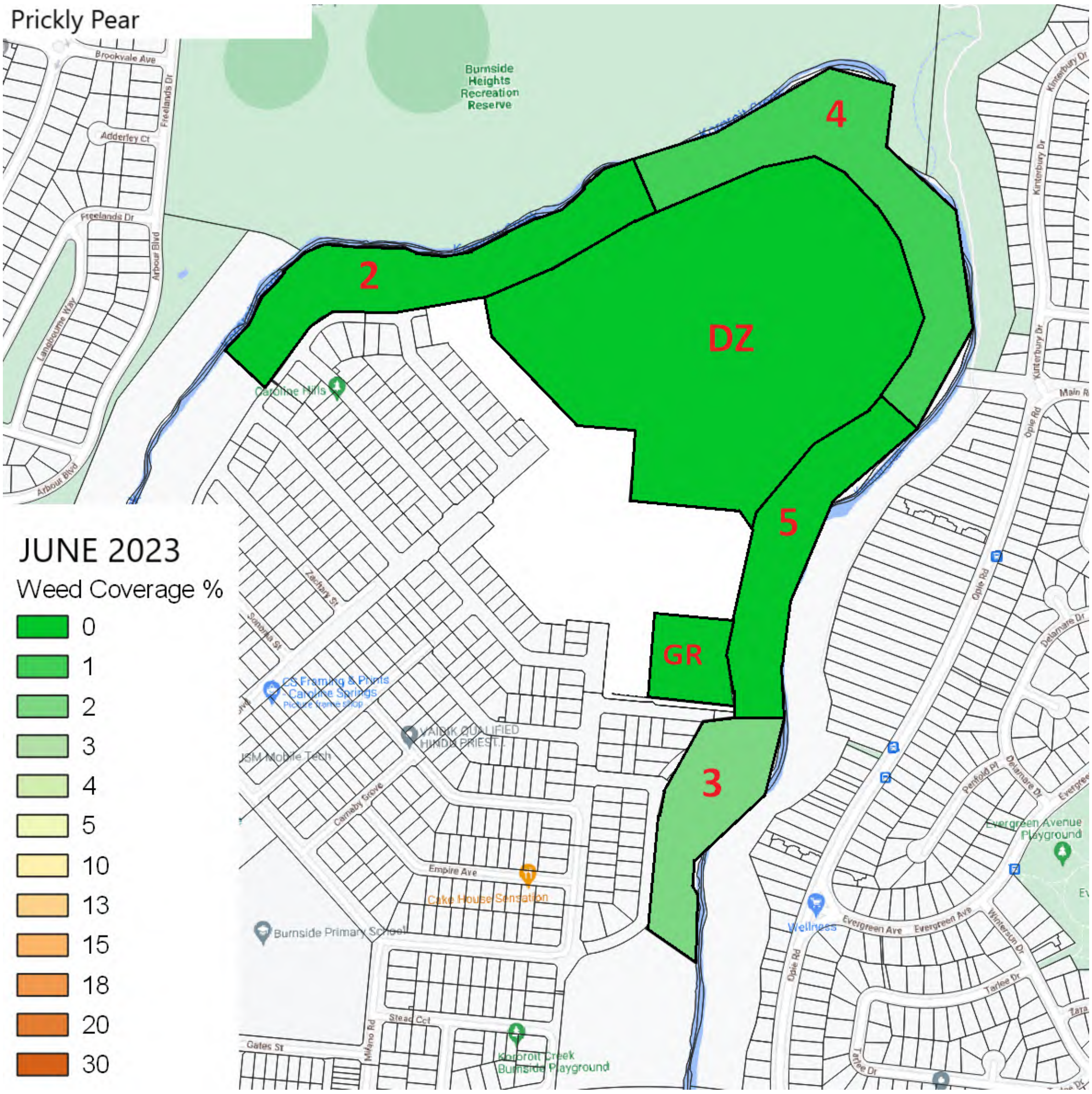
Regionally controlled **Target coverage <5%**

Current Coverage

Mgt Zone	2	4	5	3	DZ
June 2023	**0%**	**1%**	**0%**	**2%**	**0%**
March 2023	0%	0%	0%	2%	0%
September 2022	0%	0%	0%	1%	0%
June 2022	0%	0%	0%	1%	0%
March 2022	0%	0%	0%	0%	0%
December 2021	0%	0%	0%	0%	0%
October 2021	0%	0%	0%	1%	0%
August 2021	0%	1%	0%	1%	0%
Apr 2021	0%	1%	0%	1%	0%
Dec 2020	0%	1%	0%	1%	0%
Oct 2020	0%	1%	0%	1%	0%
June 2020	0%	1%	0%	0%	0%
April 2020	0%	1%	0%	1%	0%
Dec 2019	0%	1%	1%	1%	0%

Prickly pear is an erect succulent shrub which can grow to a height of 5 m. The stems of prickly pear are commonly grey green to light green. The plant usually has one main woody stem with dense prickles, which gives way to several side branches made up of fleshy segments. The segments are approximately 45 cm long, 15 cm wide and 1-2 cm thick, with the upper segments appearing to droop.

Each plant segment has areoles, which are growing points where new segments, flowers or roots can be produced. Each areole has short tuffs of finely barbed bristles and sometimes one to five sharp, 5 cm long spines. Spines are more common on segments that are older and lower on the plant.


Prickly Pear
Burnside Heights Recreation Reserve
4
2
DZ
5
GR
3
JUNE 2023
Weed Coverage %
0
1
2
3
4
5
10
13
15
18
20
30

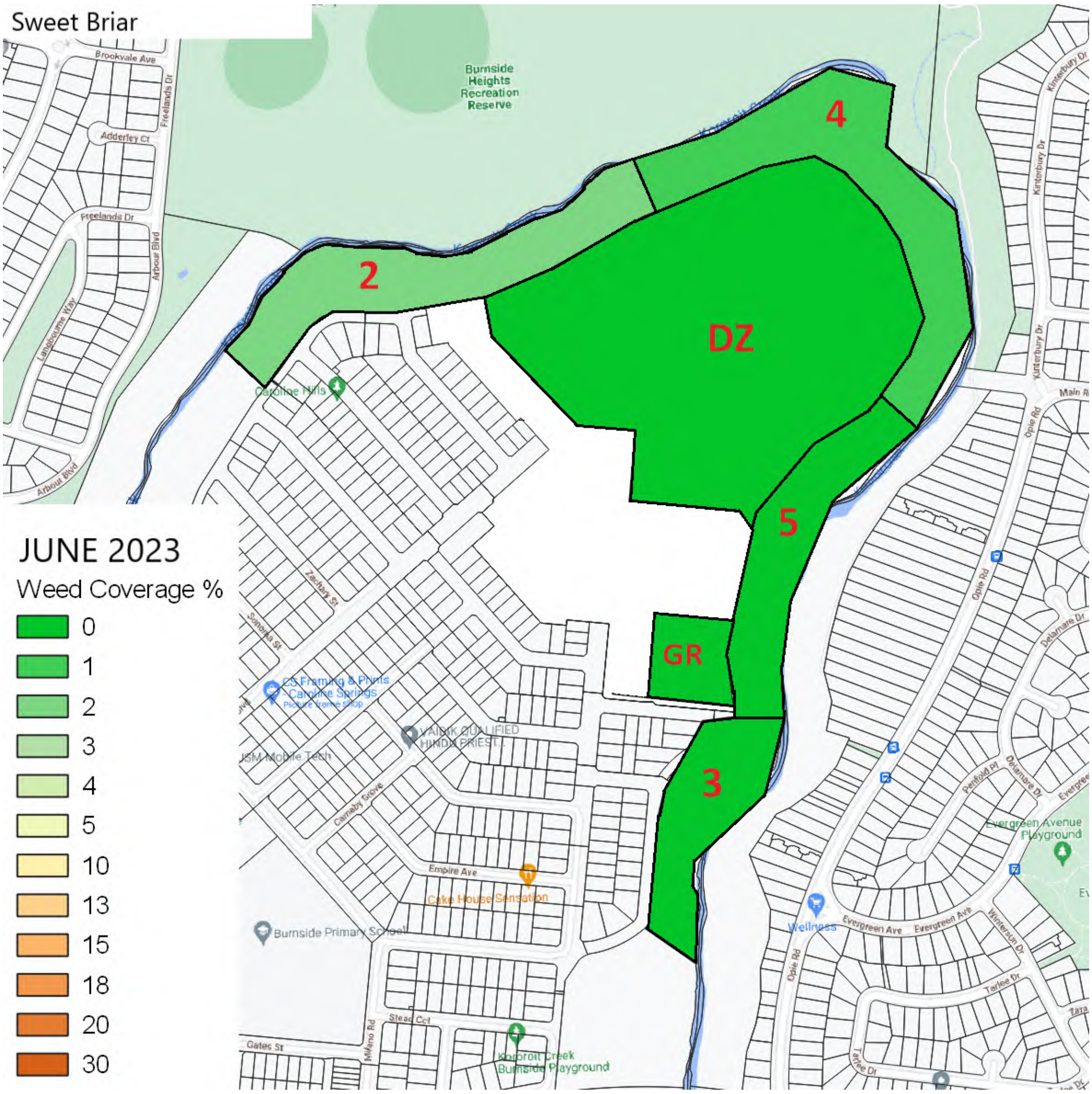
4.13 Sweet Briar - Rosa rubiginosa

Regionally Controlled **Target coverage <1%**

Current Coverage

Mgt Zone	2	4	5	3	DZ
June 2023	**2%**	**1%**	**0%**	**0%**	**0%**
March 2023	2%	2%	0%	0%	0%
September 2022	0%	0%	0%	0%	0%
June 2022	0%	0%	0%	0%	0%
March 2022	0%	2%	0%	0%	1%
December 2021	0%	0%	0%	0%	1%
October 2021	1%	1%	1%	1%	1%
August 2021	1%	1%	1%	1%	1%
Apr 2021	1%	1%	1%	1%	1%
Dec 2020	1%	1%	0%	0%	0%
Oct 2020	1%	1%	0%	0%	0%
June 2020	1%	1%	1%	0%	0%
April 2020	1%	1%	0%	1%	0%
Dec 2019	1%	1%	0%	1%	0%

Sweet briar is a perennial woody shrub up to 3m tall. The stem is usually many (and can be up to several hundred) stems arising from the rootstock; erect or scrambling, up to 3 metres high, green and smooth to brown and somewhat roughened, woody, branched, spreading and sometimes trailing, heavily covered with down-curved prickles up to 1.5 cm long.


Sweet Briar
JUNE 2023
Weed Coverage %
0
1
2
3
4
5
10
13
15
18
20
30
2
4
DZ
5
GR
3
Burnside Heights Recreation Reserve

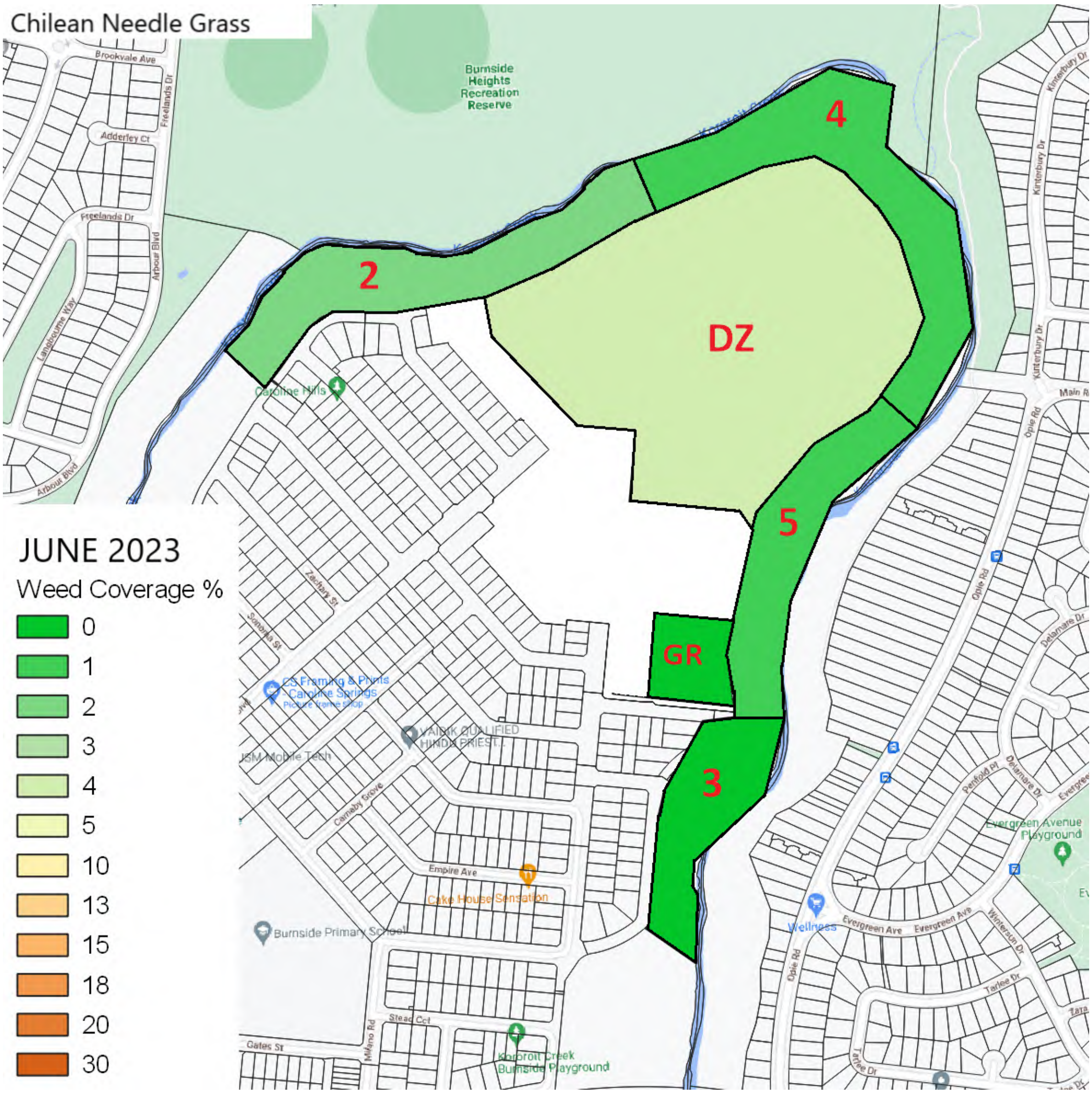
4. 14 Chilean Needle Grass - Nassella neesiana

Regional restricted **Target coverage < 5%**

Current Coverage

Mgt Zone	2	4	5	3	DZ
June 2023	**2%**	**1%**	**1%**	**0%**	**4%**
March 2023	2%	1%	1%	0%	4%
September 2022	2%	1%	0%	0%	4%
June 2022	2%	1%	0%	0%	5%
March 2022	5%	10%	5%	5%	15%
December 201	5%	5%	5%	5%	20%
October 2021	5%	3%	5%	5%	15%
August 2021	5%	3%	5%	5%	15%
Apr 2021	2%	2%	5%	5%	2%
Dec 2020	0%	0%	2%	2%	2%
Oct 2020	0%	0%	2%	5%	2%
June 2020	0%	0%	2%	1%	2%
April 2020	0%	0%	1%	5%	2%
Dec 2019	0%	0%	1%	5%	2%

Chilean needle grass is a tussocky perennial in the Spear grass group of grasses growing to about 1 m high. It leaves are hairless and are normally grow to 30 cm long and 5 mm wide. With the flowering head being to 40 cm long.



Chilean Needle Grass
JUNE 2023
Weed Coverage %
0
1
2
3
4
5
10
13
15
18
20
30
2
4
DZ
5
GR
3
Burnside Heights Recreation Reserve

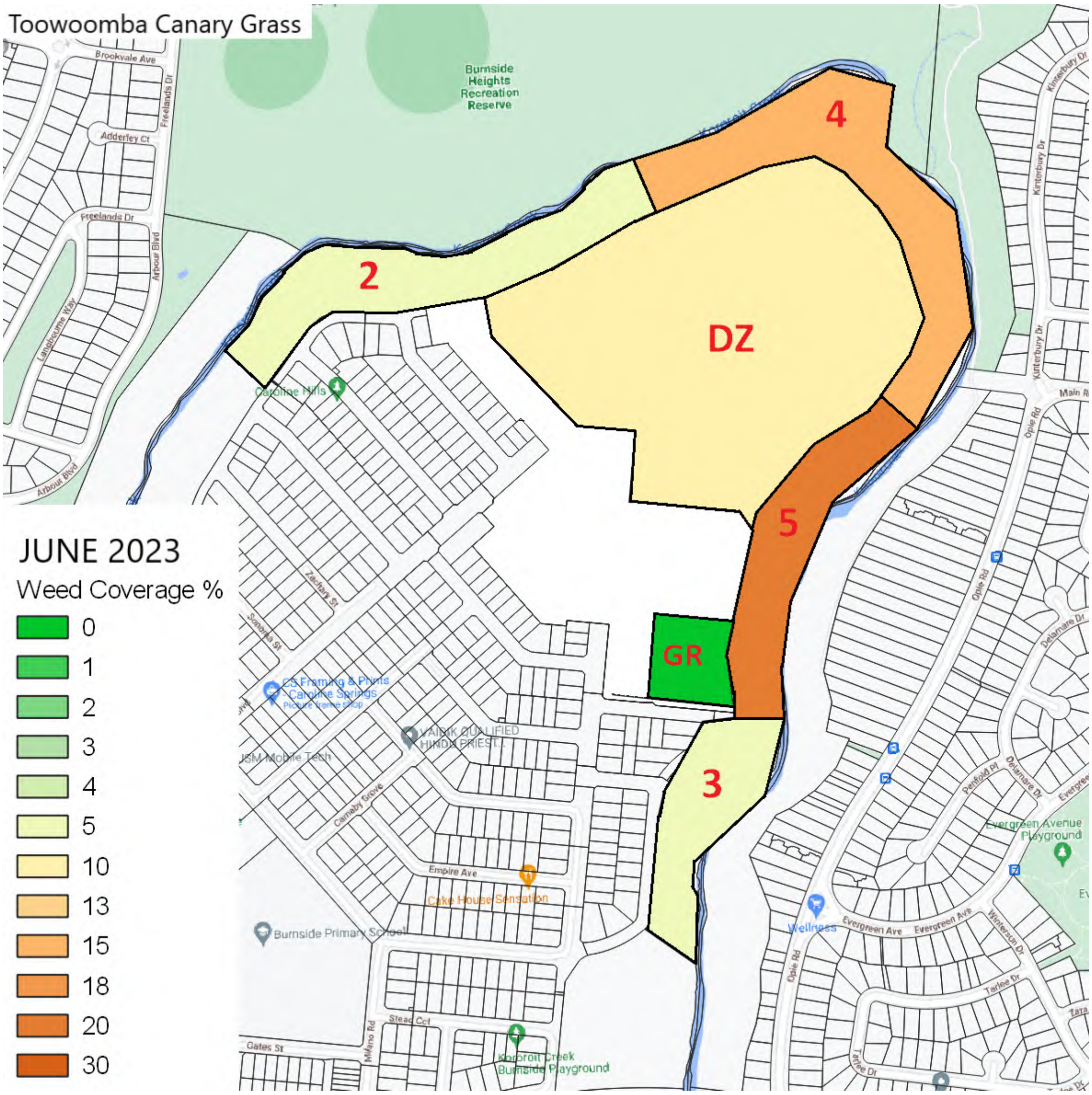
4.15 Toowoomba canary grass - Phalaris aqatica

Not declared and considered noxious **Target coverage < 5%**

Current Coverage

Mgt Zone	2	4	5	3	DZ
June 2023	**5%**	**15%**	**25%**	**5%**	**10%**
March 2023	5%	10%	20%	5%	10%
September 2022	10%	10%	15%	5%	10%
June 2022	10%	15%	20%	10%	15%
March 2022	20%	20%	20%	20%	20%
December 2021	25%	25%	20%	25%	30%
October 2021	15%	20%	20%	20%	4%
August 2021	13%	18%	20%	20%	4%
Apr 2021	5%	5%	5%	5%	2%
Dec 2020	2%	2%	2%	2%	0%
Oct 2020	5%	5%	5%	5%	0%
June 2020	2%	2%	2%	2%	0%
April 2020	2%	2%	2%	2%	0%
Dec 2019	1%	2%	5%	5%	5%

Widely used as a pasture species where annual rainfall exceeds 450 mm. It prefers fertile, seasonally moist sites. Commonly spreads from pastures, road verges and drainage ditches to adjacent indigenous vegetation. Toowoomba canary grass invades dry coastal vegetation, heathland and heathy woodland, lowland grassland and grassy woodland, dry sclerophyll forest and woodland, damp sclerophyll forest, riparian vegetation, and freshwater wetlands.



Toowoomba Canary Grass
Burnside Heights Recreation Reserve
2
4
DZ
5
GR
3
JUNE 2023
Weed Coverage %
0
1
2
3
4
5
10
13
15
18
20
30

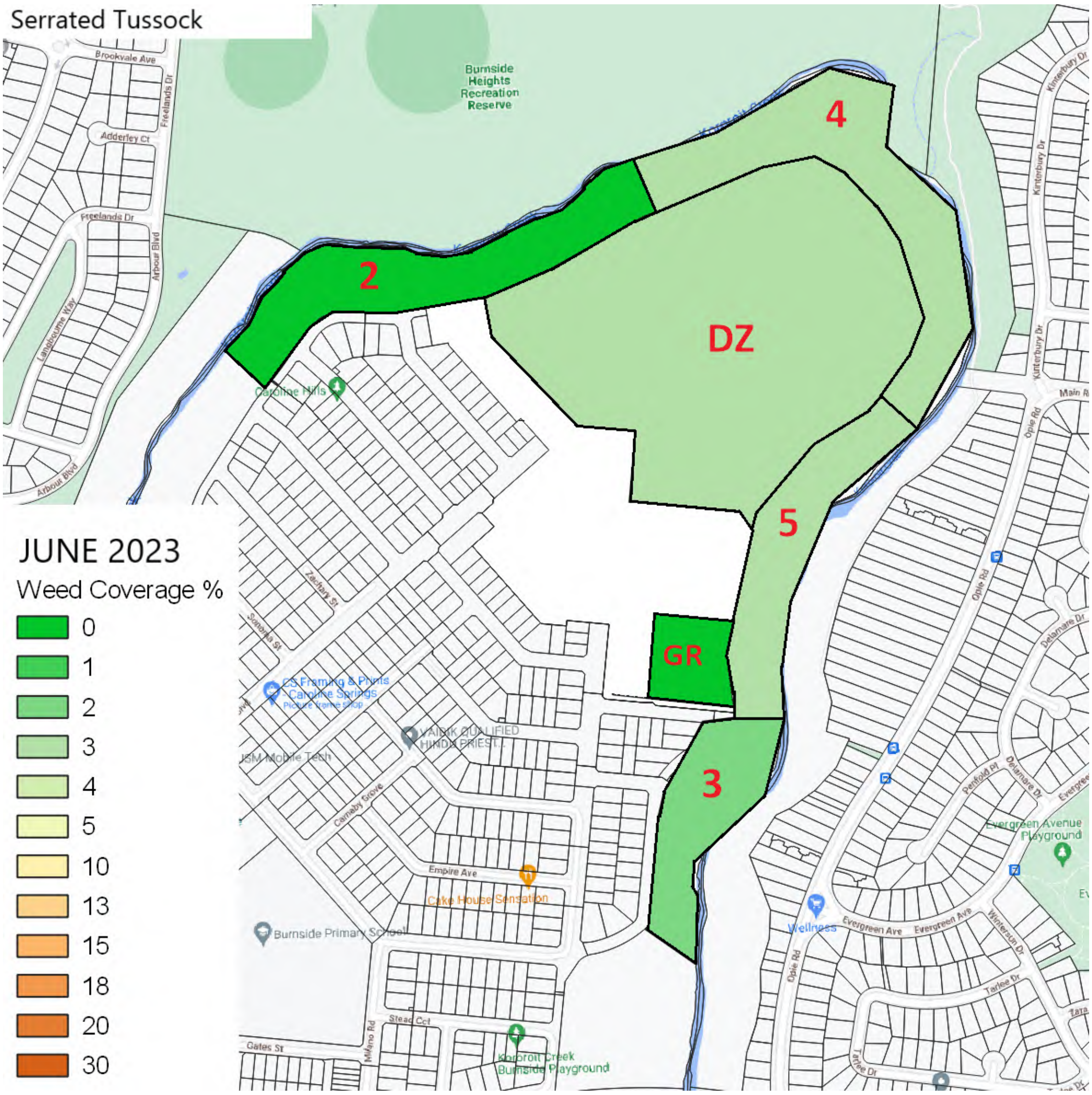
4.16 Serrated Tussock - Nassella trichotoma

Regionally Controlled - *Weed of National Significance* **Target coverage < 5%**

Current Coverage

Mgt Zone	2	4	5	3	DZ
June 2023	**0%**	**3%**	**3%**	**2%**	**3%**
March 2023	0%	3%	3%	1%	3%
September 2022	0%	1%	1%	1%	3%
June 2022	2%	5%	2%	2%	10%
March 2022	2%	10%	5%	5%	10%
December 2021	5%	10%	5%	5%	15%
October 2021	10%	15%	5%	10%	30%
August 2021	5%	15%	5%	10%	13%
Apr 2021	5%	5%	5%	5%	10%
Dec 2020	2%	2%	2%	2%	2%
Oct 2020	5%	5%	5%	2%	5%
June 2020	5%	5%	5%	2%	5%
April 2020	5%	5%	5%	2%	5%
Dec 2019	5%	5%	5%	5%	10%

Serrated tussock is a long-lived perennial grass growing up to 60cm in height with a base of 25cm in diameter. Plant size varies with soil fertility and location. In infertile conditions plants may only reach a height of 15cm. Serrated tussock is shallow rooted with an extensive network of fibrous roots occurring predominantly in the top 20cm of soil. The roots are dense, wiry, and fibrous making serrated tussock very difficult to pull out, even when small. Flowering stems emerge from the base of the plant. They are multi-branched and up to 35cm long. The purple colour of the small seeds produces an overall purplish haze to the serrated tussock seed head. Once the seeds have formed, the entire seed head will 'droop' over the tussock towards the ground. Flowering takes place as early as late winter (August) and will continue throughout the spring (September – November). Autumn flowering has been known to occur. Seeds take 8 – 10 weeks to mature, normally occurring throughout the spring and summer months. Once seeds are ripe, the whole flowing stem detaches from the base of the plant and is dispersed by the wind. Seed is dormant and will not germinate for about 6 months.

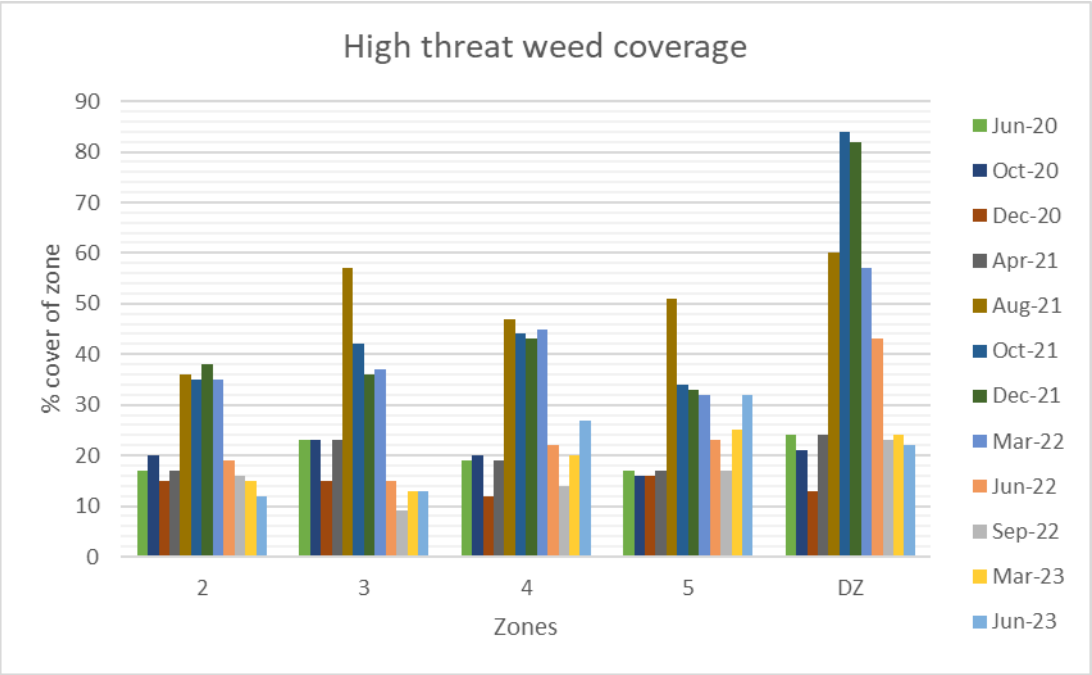

Serrated Tussock
Burnside Heights Recreation Reserve
4
2
DZ
5
GR
3
JUNE 2023
Weed Coverage %
0
1
2
3
4
5
10
13
15
18
20
30

6.0 Summary

6.1 Overview

The below table displays the total percentage coverage in each zone of high-threat weeds. Since the previous report, there has been the slightest increase in the overall coverage of high-threat weeds across zones 4 and 5. During this visit, it was noted that *Phalaris aquatica* (Toowoomba Canary Grass) has become the most dominant species throughout most zones.

Approximately 60% of the development zone is now under construction and 50% of Zone 3 and Zone 2 have also been developed.



6.2 Zone 2

This zone has been developed by landscapers which has reduced the zone by 50%. The zone is becoming less dominated by the highly invasive large grass *Phalaris aquatica*. Removal of the species is being done slowly, concentrating on the areas of higher vegetation value outwards to allow the natural regeneration of the newly opened areas without significantly increasing the chances of erosion.

As previously noted, all woody weeds have been controlled, with a limited number of small Rosa rubiginosa on the site.

6.3 Zone 4

This zone has had a spike by the highly invasive large grass *Phalaris aquatica*. Future removal of the species should be done slowly, concentrating from the areas of higher vegetation value outwards to allow the natural regeneration of the newly opened areas without significantly increasing the chances of invasion by other unfavourable species such as one of the *Nasella sp*. on site.

All woody weeds had been controlled, with a limited number of specimens counted across the site. A small patch of Century Plant *(Agave Americana)* is slowly being controlled.

6.4 Zone 5

There has been a slight increase by the highly invasive large grass *Phalaris aquatica*. Future removal of the species should be done slowly, concentrating from the areas of higher vegetation value outwards to allow the natural regeneration of the newly opened areas without significantly increasing the chances of invasion by other unfavourable species such as one of the *Nasella sp*. on site.

All woody weeds have been controlled, with a limited number of specimens counted across the site.

6.5 Zone 3

This becoming less dominated each quarter by the highly invasive large grass *Phalaris aquatica*. Future removal of the species should be done slowly, concentrating from the areas of higher vegetation value outwards to allow the natural regeneration of the newly opened areas without significantly increasing the chances of invasion by other unfavourable species such as one of the *Nasella sp*. on site. Landscape works are completed along the roadside of this zone reducing the area by about 50%. There is one Prickly Pear *(Opuntia spp.)* located on the vertical ledge.

6.7 Development zone

This area varies significantly, with patches dominated by the native Kangaroo and Wallaby grass and others previously dominated by Serrated Tussock, now dominated by *Phalaris aquatica*. Also, various patches of Artichoke Thistle (*Cynara cardunculus) are* starting to decline, through weed management controls and the shrinking of the DZ due to increased development.

7.0 Conclusion

A low prevalence of herbaceous high threat weeds (Spear Thistle, Fennel, Cape weed or Paterson's Curse) and slow decline of the *Phalaris aquatica* but still the dominant weed in various zones. *Phalaris aquatica* plants along the creek line have remained untreated for the last several visits. Areas where the Phalaris has been removed it is being replaced by Nassella trichotoma (Serrated Tussock).

Rather than a widespread herbicide treatment, future slashing regimes, interspersed with selective treatments where individuals and or small stands are near higher vegetation values may be a better path moving forward. This has and shall continue to be incorporated into the future treatment regime. Due to the increase of the Phalaris and Nassella in Zone 5 and 4, the focus should be on these species moving forward until numbers are brought back to controllable numbers.

The considerable number of Artichoke Thistles (*Cynara cardunculus)* in the Development zone has been reduced and further control is required to prevent spread to other zones.

Weed Survey Report

Modeina Estate - Phase 2 -

March 2023

Submitted by Adam Gallagher

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Email: adamg@australianecosystems.com.au

Contents

1.0 Introduction

Australian Ecosystems (AE) has prepared this report for Dennis Family Corporation (Project Management) Pty Ltd. This report details the results of weed surveys conducted in March 2023 within the area described as 'Stage 2 Modeina'. This report should be read in conjunction with, 'Modeina Weed Management Strategy' that Greening Australia prepared in 2017.

2.0 Weeds Surveyed

This survey has captured these weed species listed below:

- African Boxthorn *(Lycium ferocissimum)*
- Artichoke Thistle (*Cynara cardunculus)*
- Spear Thistle *(Cirsium vulgare)*
- Bridal Creeper *(Asparagus asparagodies)*
- Cape weed (*Arctotheca calendula)*
- Century Plant *(Agave Americana)*
- Fennel *(Foeniculum vulgare)*
- Galenia *(Galenia pubescens)*
- Horehound *(Marrubim vulgare)*
- Paterson's Curse *(Echium plantagineum)*
- Prickly Pear *(Opuntia spp.)*
- Sweet Briar *(Rosa rubiginosa)*
- Chilean Needle Grass *Nassella neesiana)*
- Toowoomba canary grass *(Phalaris aquatica)*
- Serrated Tussock *(Nassella trichotoma)*

Determined by:

The weeds detailed within this report have been taken from the Modeina Weed Management Strategy that Greening Australia prepared in 2017. Only species that are widespread and/or have a high level of risk have been chosen to be controlled within these areas.

3.0 Survey Methodology

The above-mentioned species were surveyed using the Random Quadrant Sampling Method. Within each zone, four quadrants 5-meter X 5-meter were used to measure the current number of weed species present and then converted to a percentage cover. The results from these quadrants were then extrapolated to obtain a percentage cover across each of the zones. The results of these surveys are displayed over the following pages of the report.

3.1 Woody weeds

For this survey woody weeds are classified as African Boxthorn *(Lycium ferocissimum)*, Century Plant *(Agave Americana),* Fennel *(Foeniculum vulgare),* Prickly Pear *(Opuntia spp.)* and Sweet Briar *(Rosa rubiginosa)*.

All species had an extremely low abundance across all zones, hence these species were individually counted, and each individual was given a percentage cover value of 2%, to allow for the maximum projected canopy that they can reach once mature. It should be noted that those observed were generally still in their juvenile stage, with a projected canopy cover of much less than 2% of 25m^2. Zone 3 had a small cluster of Prickly Pear *(Opuntia spp.).* In zone 4 there were a couple of patches of Century Plant *(Agave Americana)*

3.2 Herbs and Grass Weeds

Herb and grass weeds are reduced across all zones. These weeds include Artichoke Thistle (*Cynara cardunculus)*, Scotch Thistle *(Onopordum acanthium),* Spear Thistle *(Cirsium vulgare),* Bridal Creeper *(Asparagus asparagodies),* Cape weed (*Arctotheca calendula),* Galenia *(Galenia pubescens),* Horehound *(Marrubim vulgare),* Paterson's Curse *(Echium plantagineum),* Chilean Needle Grass *Nassella neesiana),* Toowoomba canary grass *(Phalaris aquatica)* and Serrated Tussock *(Nassella trichotoma).* There are still some large pockets of Toowoomba canary grass *(Phalaris aquatic),* but this also is reducing in numbers and will be reduced even further during further maintenance visits.

3.3 Changes

Civil construction has continued within the development zone. As previously mentioned, this has reduced the area surveyed by approximately 60%. Works have been completed along the edge (roadside) of Zone 3 which has reduced the area by about 50% and along the road edge in Zone 2 also reduced the area by 50%. These planned works do not affect the survey result of this or any previous survey.

4.0 Details of Surveyed Weeds

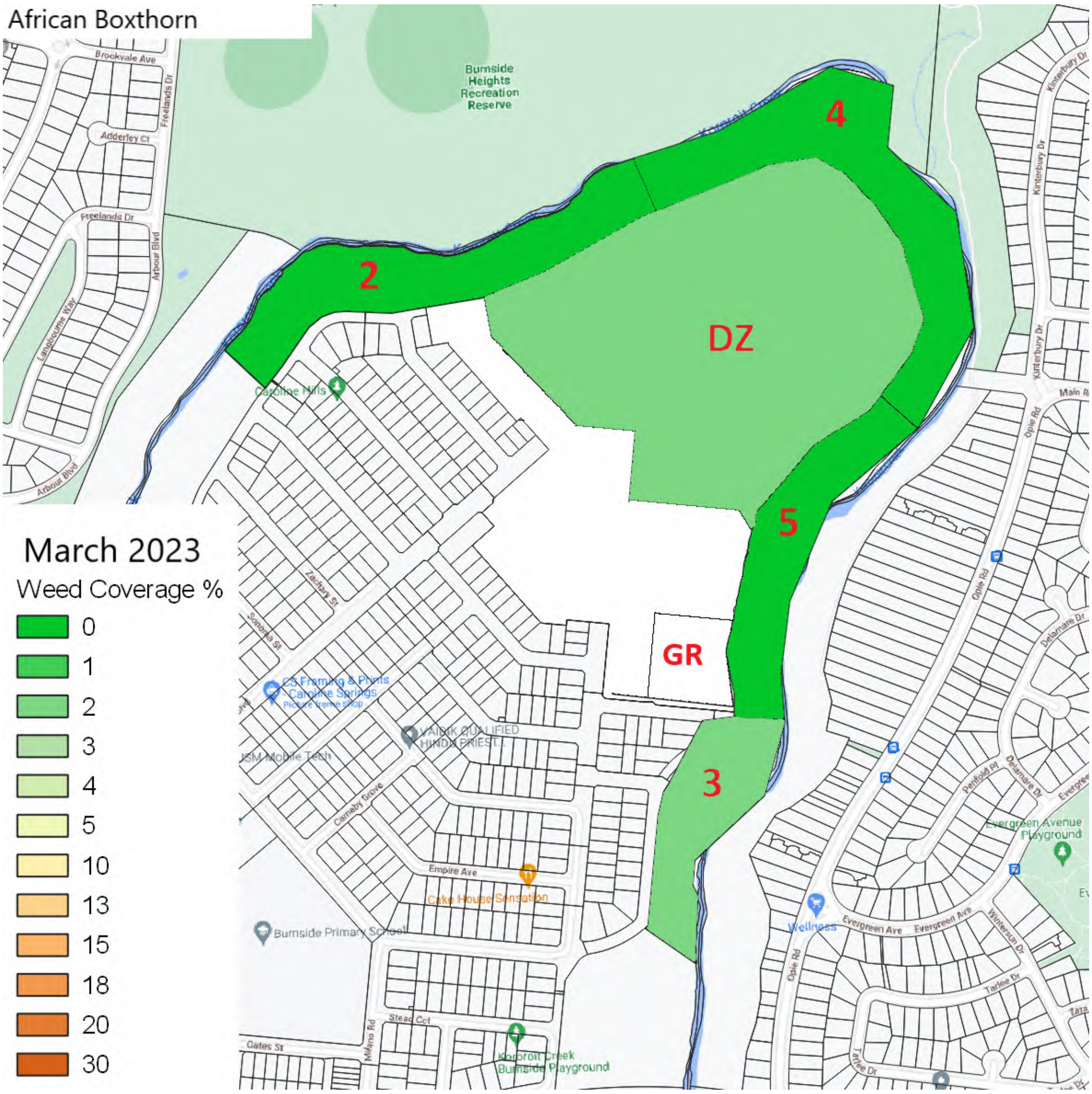
4.1 African Boxthorn - Lycium ferocissimum

Regionally Controlled & Weed of National Significance **Target coverage <1%**

Current coverage

Mgt Zone	2	4	5	3	DZ
March 2023	**0%**	**0%**	**0%**	**2%**	**2%**
September 2022	0%	0%	0%	1%	1%
June 2022	0%	0%	0%	1%	1%
March 2022	0%	1%	0%	0%	1%
December 2021	0%	0%	0%	0%	1%
October 2021	0%	0%	0%	0%	1%
August 2021	1%	1%	1%	1%	2%
April 2021	1%	1%	1%	1%	1%
Dec 2020	0%	1%	1%	0%	1%
Oct 2020	0%	1%	1%	0%	1%
June 2020	0%	1%	1%	0%	1%
April 2020	0%	1%	1%	0%	1%
Dec 2019	0%	1%	1%	0%	1%

African boxthorn is a rounded, woody, densely branched and very thorny large shrub up to 5 metres high. African boxthorn reproduces exclusively by seed, which is commonly eaten by birds, seed is viable when excreted. These plants are often found near places where birds have perched such as trees, poles, and powerlines. It was widely planted as a hedge plant before its weedy potential was realised. Spread also occurs from contaminated produce and materials. African boxthorn is a fast-growing invasive species that, if untreated, spreads quickly. Seeds may germinate year-round and early root growth is rapid, ensuring young plants are competitive. Plants take at least two years to flower, producing flowers and fruit mostly in summer. Some flowering and fruit production occurs at other times of year. Sometimes deciduous in winter, with new leaves and active growth in spring. Broken roots and cut stumps can sprout regrowth.


African Boxthorn
Burnside Heights Recreation Reserve
2
4
DZ
5
GR
3
March 2023
Weed Coverage %
0
1
2
3
4
5
10
13
15
18
20
30

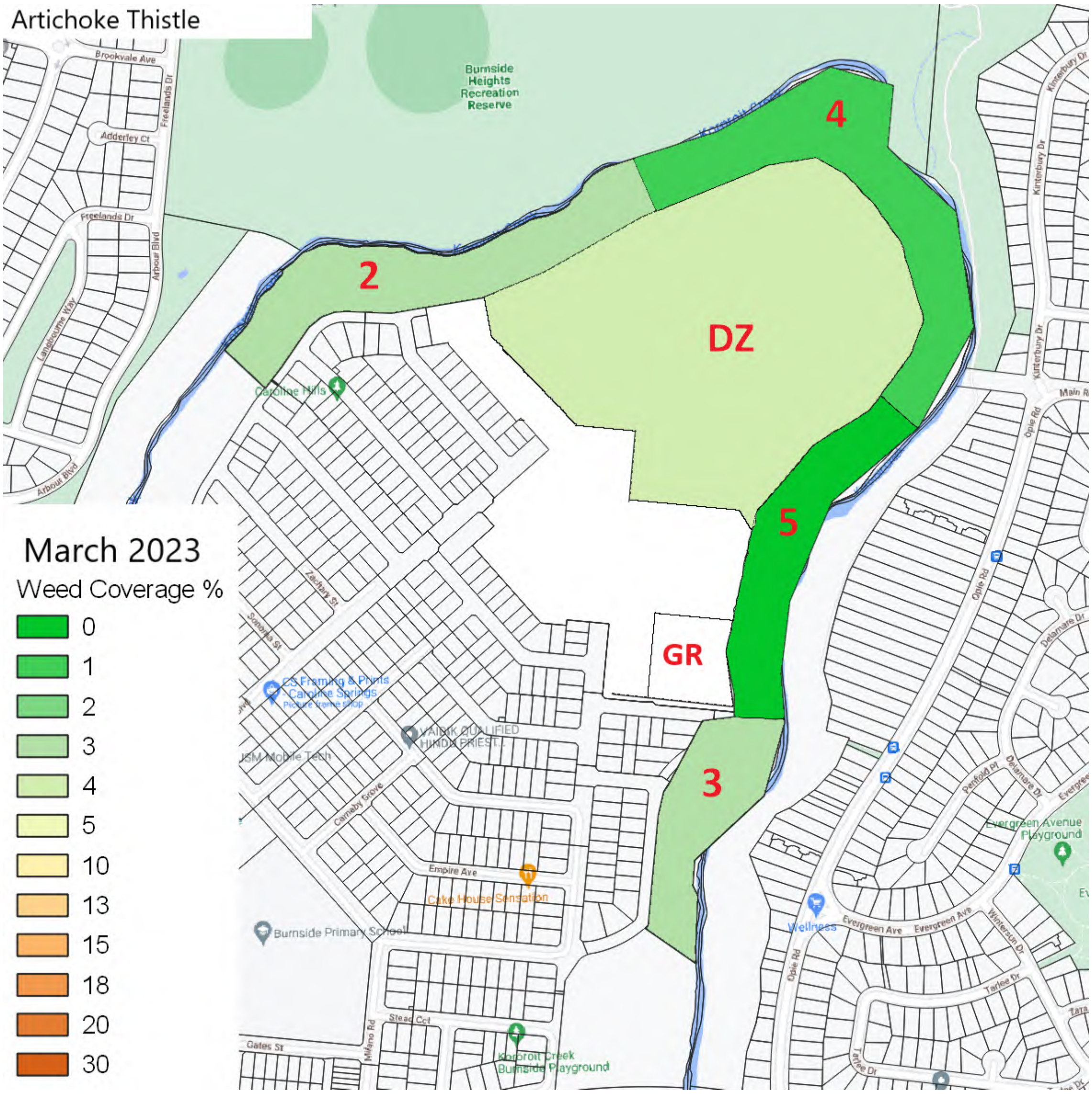
4.2 Artichoke Thistle - Cynara cardunculus

Regionally Controlled **Target coverage < 5%**

Current coverage

Mgt Zone	2	4	5	3	DZ
March 2023	**3%**	**1%**	**0%**	**3%**	**4%**
September 2022	1%	0%	0%	1%	4%
June 2022	1%	0%	0%	1%	10%
March 2022	2%	0%	0%	2%	2%
December 2021	0%	0%	0%	0%	5%
October 2021	0%	0%	0%	0%	10%
August 2021	5%	2%	15%	15%	10%
Apr 2021	15%	2%	2%	2%	5%
Dec 2020	5%	2%	5%	2%	5%
Oct 2020	5%	5%	2%	2%	10%
June 2020	2%	10%	5%	5%	10%
April 2020	25%	20%	15%	20%	20%
Dec 2019	10%	15%	15%	5%	15%

A perennial or biennial spiny thistle with annual tops and a cluster of large bright purple flowers that are 5-8 cm in diameter during summer. The mature plant is erect, with stems 1- 2 m tall arising from a bushy rosette up to 2 m wide and tall. The stem is strongly ribbed and covered with downy grey hairs and usually single at the base and branched towards the top. The large, grey green leaves are deeply lobed and spiny with woolly hairs underneath.


Artichoke Thistle
Burnside Heights Recreation Reserve
4
2
DZ
5
GR
3
March 2023
Weed Coverage %
0
1
2
3
4
5
10
13
15
18
20
30

4.4 Spear Thistle - Cirsium vulgare

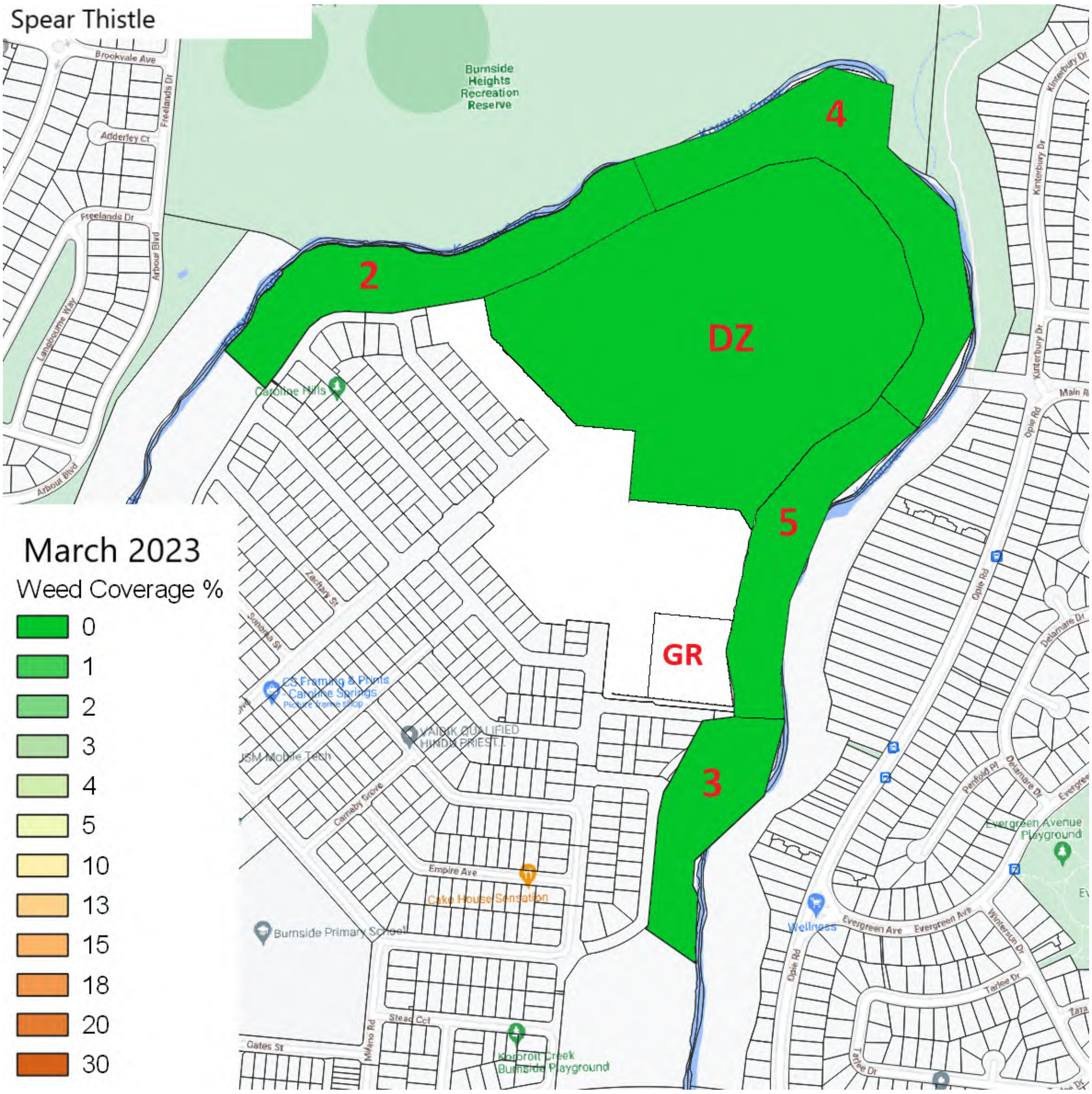
Regionally Controlled Weeds ***Target coverage <5%***

Current coverage

Mgt Zone	2	4	5	3	DZ
March 2023	**0%**	**0%**	**0%**	**0%**	**0%**
September 2022	0%	0%	0%	0%	0%
June 2022	0%	0%	0%	0%	0%
March 2022	0%	0%	0%	0%	0%
December 2021	0%	0%	0%	0%	0%
October 2021	0%	0%	0%	0%	0%
August 2021	0%	0%	0%	0%	0%
Apr 2021	0%	0%	0%	0%	0%
Dec 2020	1%	0%	0%	0%	1%
Oct 2020	1%	0%	0%	0%	1%
June 2020	1%	0%	0%	0%	1%
April 2020	1%	0%	0%	0%	1%
Dec 2019	2%	5%	1%	1%	1%

An annual or short-term perennial herb with erect growth to 1.5 m tall. Stems have spiny wings and are cobwebby. Upper leaf surface is dark green and rough while the lower surface is white with short, matted hairs.

A common species of wet or summer-moist land, including swamps, depressions, drains, wasteland, pastures, and cultivated soils. Prefers open, non-shaded environments, heavy textured soils, and good fertility.


Spear Thistle
March 2023
Weed Coverage %
0
1
2
3
4
5
10
13
15
18
20
30
DZ
GR
2
3
4
5
Burnside Heights Recreation Reserve

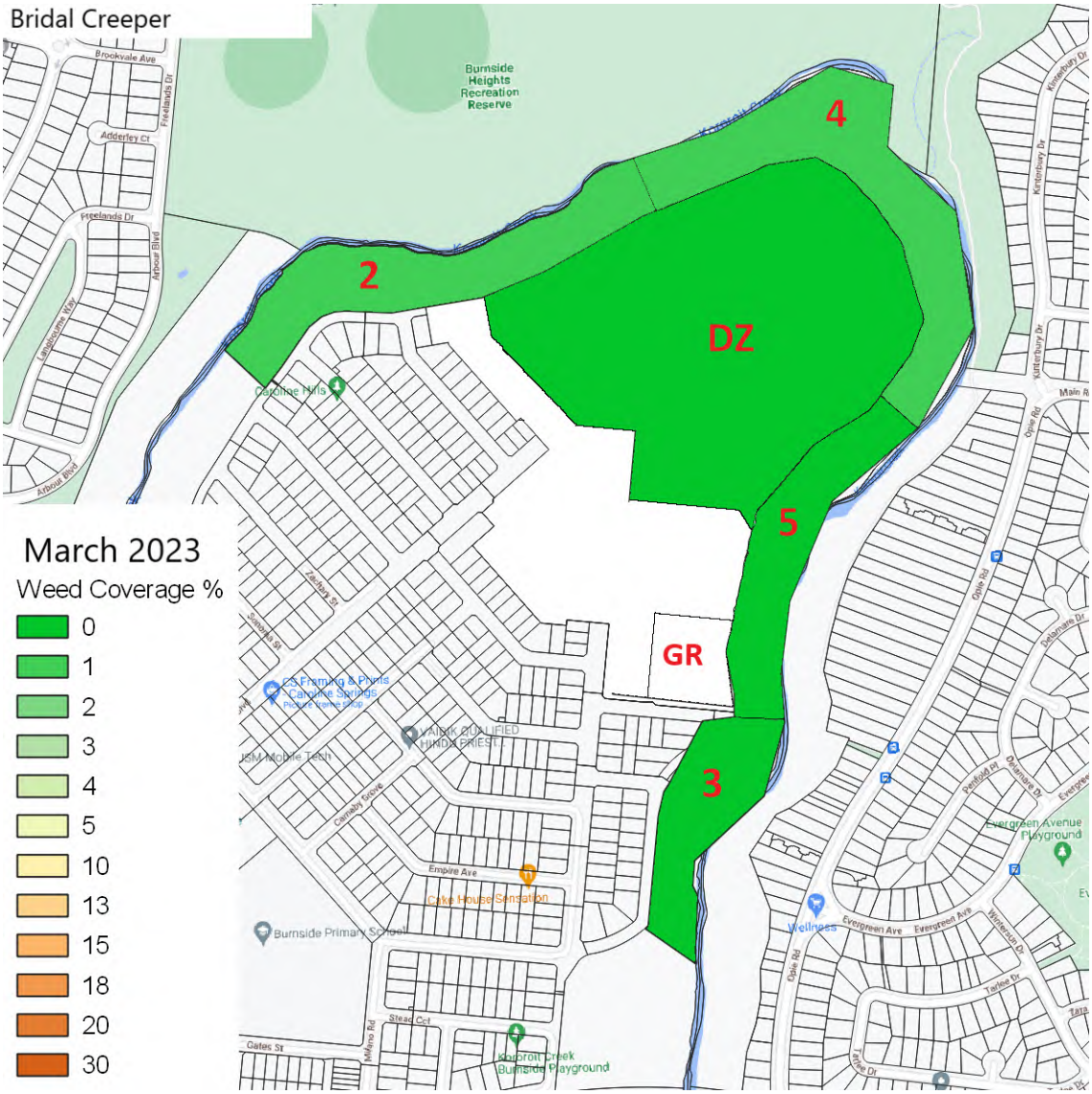
4.5 Bridal Creeper - Asparagus asparagodies

Regionally Controlled - Weed of National Significance **Target coverage < 1%**

Current Coverage

Mgt Zone	2	4	5	3	DZ
March 2023	**1%**	**1%**	**0%**	**0%**	**0%**
September 2022	1%	1%	0%	0%	0%
June 2022	1%	1%	0%	0%	0%
March 2022	2%	1%	0%	0%	0%
December 2021	2%	2%	2%	0%	0%
October 2021	3%	3%	2%	0%	0%
August 2021	5%	4%	3%	0%	0%
Apr 2021	1%	1%	1%	0%	0%
Dec 2020	0%	1%	1%	0%	0%
Oct 2020	0%	0%	1%	0%	0%
June 2020	0%	0%	1%	0%	0%
April 2020	0%	0%	1%	0%	0%
Dec 2019	0%	0%	0%	0%	0%

It is regarded as one of the worst weeds in Australia because of its invasiveness, potential for spread, and economic and environmental impacts. Bridal creeper entered the country as a garden plant and is now a major weed of bushland in southern Australia, where its climbing stems and foliage smother native plants. It forms a thick mat of underground tubers which impedes the root growth of other plants and often prevents seedling establishment. Rare native plants, such as the rice flower *Pimelea spinescens*, are threatened with extinction by Bridal Creeper.


Bridal Creeper
Burnside Heights Recreation Reserve
4
2
DZ
5
GR
3
March 2023
Weed Coverage %
0
1
2
3
4
5
10
13
15
18
20
30
Burnside Primary School
Cake House Sensation
Wellness
Evergreen Avenue Playground
Burnside Playground

4.6 Cape weed - Arctotheca calendula

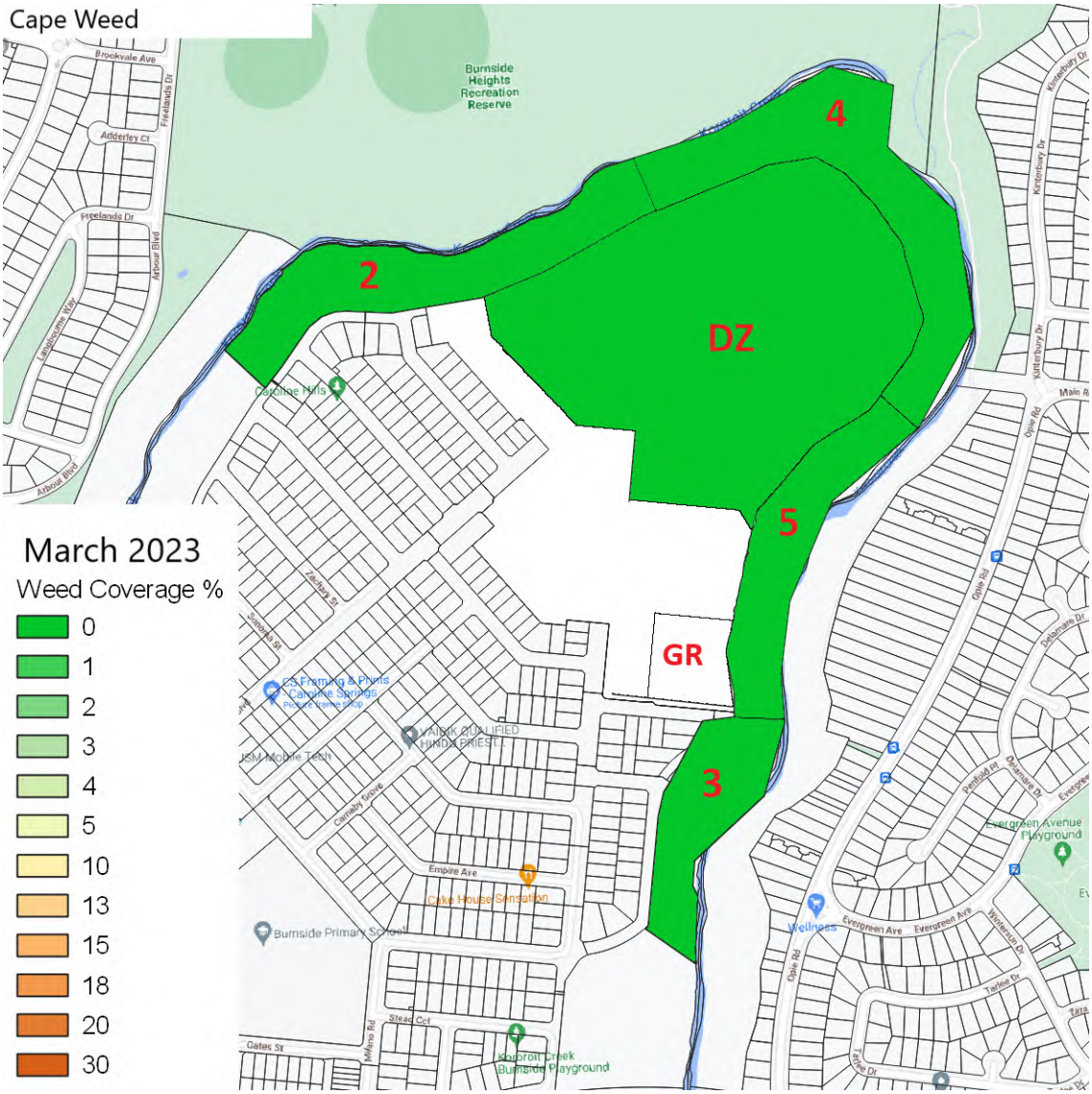
Not declared or considered noxious **Target coverage < 5%**

Current Coverage

Mgt Zone	2	4	5	3	DZ
March 2023	**0%**	**0%**	**0%**	**0%**	**0%**
September 2022	0%	0%	0%	0%	0%
June 2022	0%	0%	0%	0%	0%
March 2022	0%	0%	0%	2%	2%
December 2021	0%	0%	0%	0%	0%
October 2021	0%	0%	0%	0%	0%
August 2021	0%	0%	0%	0%	0%
Apr 2021	0%	0%	0%	0%	0%
Dec 2020	0%	0%	0%	0%	0%
Oct 2020	0%	1%	1%	1%	0%
June 2020	2%	2%	0%	2%	0%
April 2020	2%	2%	1%	2%	0%
Dec 2020	2%	2%	1%	2%	0%

This plant is widespread and common weed in pastures, lawns, cultivation, and waste areas across Victoria. Typically, a plant of fresh-water habitats but may occur on the fringes of saline swamps and flats during wetter periods.

It is stemless or shortly stemmed, herb, 80 cm wide and 30 cm high, with a taproot and a basal rosette of leaves. Leaves are 5-25 cm long and 2-6 cm wide.


Cape Weed
Burnside Heights Recreation Reserve
4
2
DZ
5
GR
3
March 2023
Weed Coverage %
0
1
2
3
4
5
10
13
15
18
20
30
Burnside Primary School
Cake House Sensation
Evergreen Avenue Playground
Burnside Playground

4.7 Century Plant - Agave americana

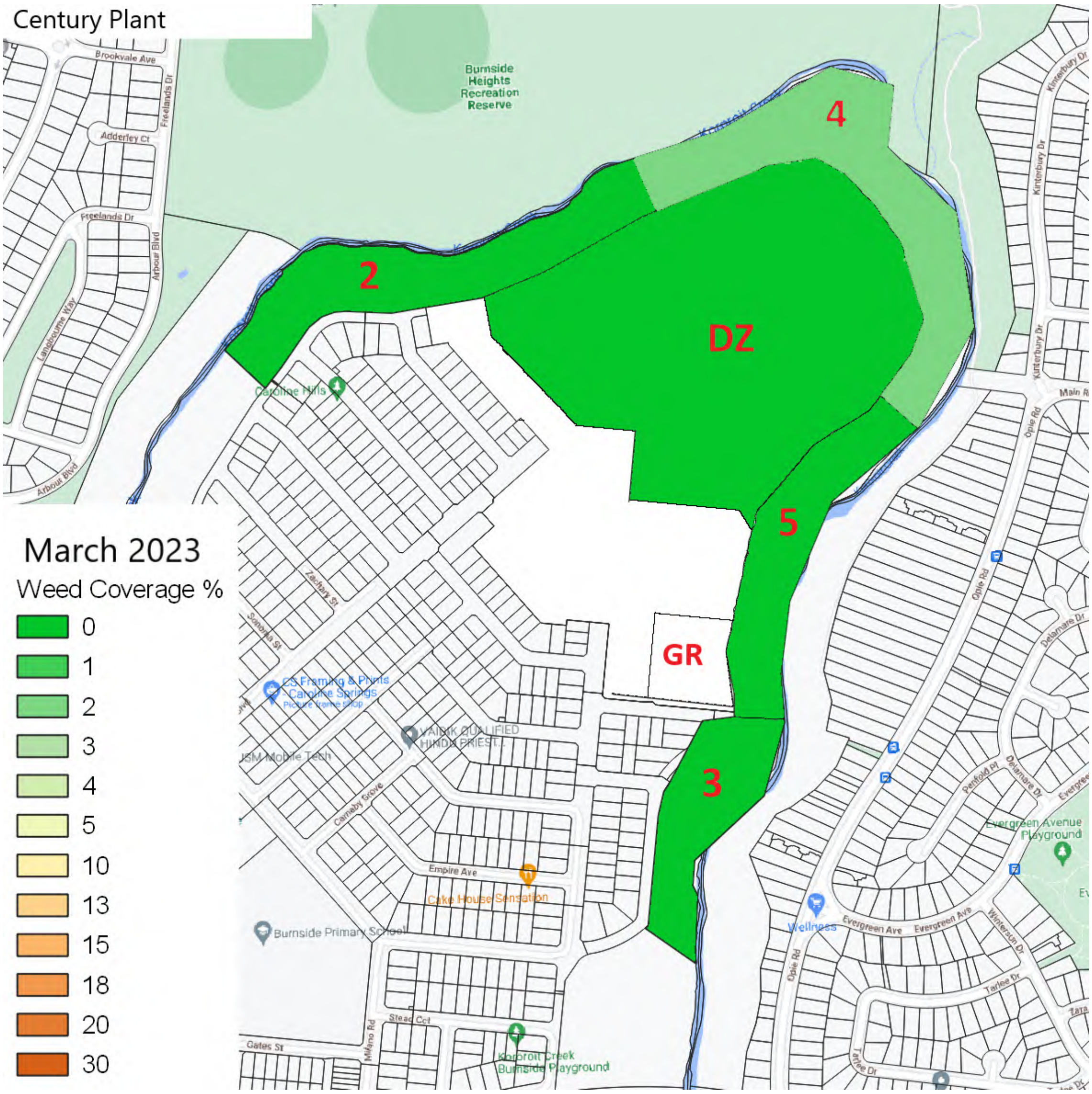
Not declared or considered noxious **Target coverage < 1%**

Current Coverage

Mgt Zone	2	4	5	3	DZ
March 2023	**0%**	**2%**	**0%**	**0%**	**0%**
September 2022	0%	1%	0%	0%	0%
June 2022	1%	0%	0%	0%	0%
March 2022	0%	0%	0%	0%	0%
December 2021	0%	0%	0%	0%	0%
October 2021	0%	0%	0%	0%	0%
August 2021	0%	0%	0%	0%	0%
Apr 2021	1%	0%	0%	0%	0%
Dec 2020	1%	0%	0%	0%	0%
Oct 2020	1%	0%	0%	0%	0%
June 2020	1%	0%	0%	0%	0%
April 2020	1%	0%	0%	0%	0%
Dec 2019	1%	0%	0%	0%	0%

A very large and long-lived rosette-forming plant, growing 1-2 m high and 2-4 m across.

Older individuals may sometimes develop a short woody stem at the base of the plant and commonly produces numerous suckers which form a large clump or colony. When fully mature this plant will develops a massive flower cluster on a robust flowering stem 6-12 m tall.



Century Plant
March 2023
Weed Coverage %
0
1
2
3
4
5
10
13
15
18
20
30
2
4
DZ
5
GR
3
Burnside Heights Recreation Reserve

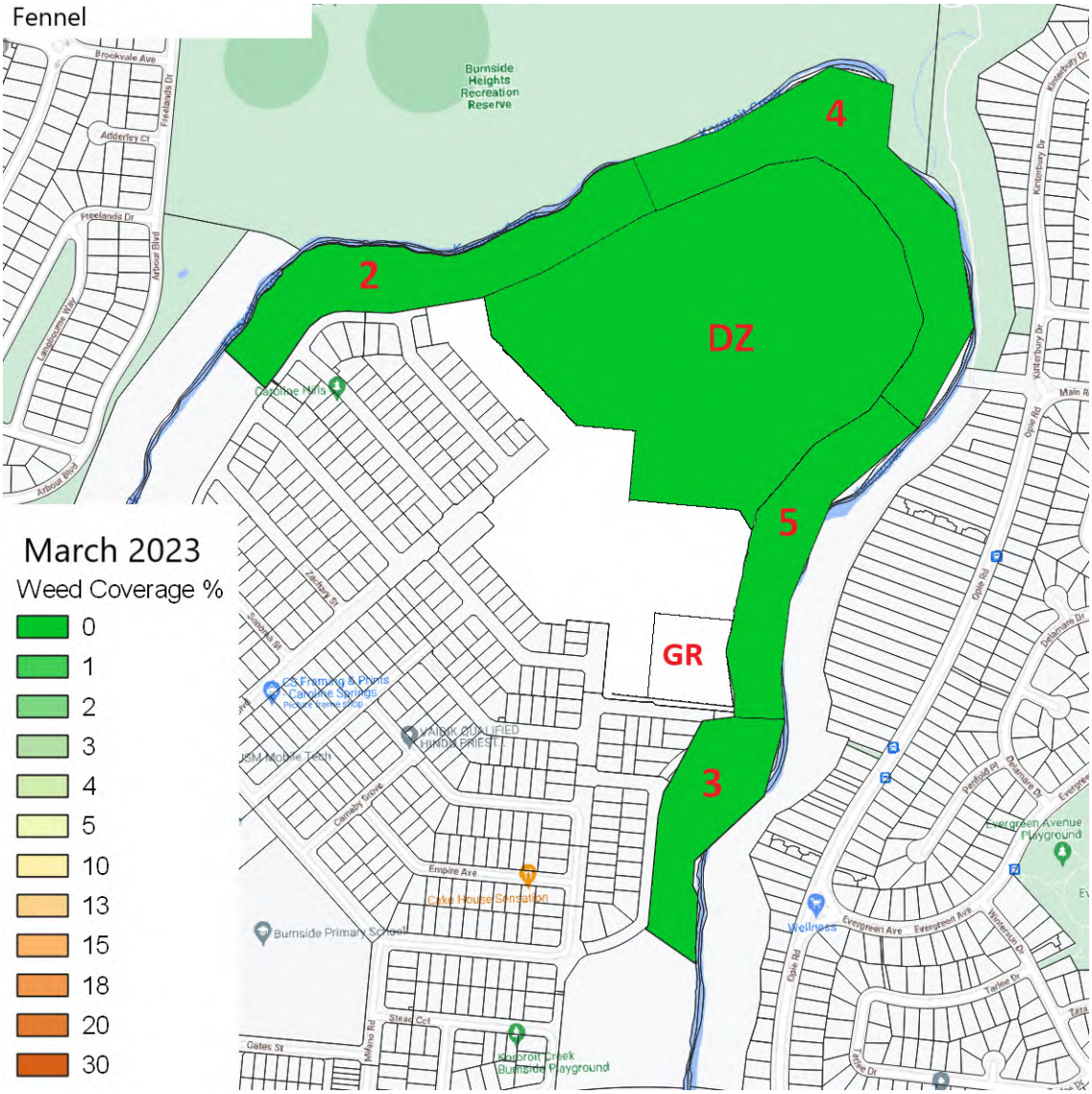
4.8 Fennel - Foeniculum vulgare

Restricted Weeds **noxious** **Target coverage < 1%**

Current Coverage

Mgt Zone	2	4	5	3	DZ
March 2023	**0%**	**0%**	**0%**	**0%**	**0%**
September 2022	0%	0%	0%	0%	0%
June 2022	0%	0%	0%	0%	0%
March 2022	0%	0%	0%	0%	0%
December 2021	0%	0%	0%	0%	0%
October 2021	0%	0%	0%	0%	0%
August	0%	0%	0%	0%	0%
Apr 2021	0%	0%	0%	0%	0%
Dec 2020	1%	0%	0%	1%	0%
Oct 2020	0%	0%	0%	0%	0%
June 2020	0%	0%	0%	0%	0%
April 2020	0%	0%	0%	0%	0%
Dec 2019	0%	1%	1%	1%	0%

An erect multi-stemmed perennial herb commonly 1.5 to 2.0 metres high. It is found along waterways, drainage lines and in seasonally moist locations within grasslands and woodlands. Dense infestations may restrict access to waterways. A soft, herbaceous plant the high growth of the plant may be a nuisance to people.


Fennel
Burnside Heights Recreation Reserve
4
2
DZ
5
GR
3
March 2023
Weed Coverage %
0
1
2
3
4
5
10
13
15
18
20
30
Burnside Primary School
Cake House Sensation
Evergreen Avenue Playground
Burnside Playground

4.9 Galenia - Galenia pubescens

Not declared or considered noxious **Target coverage < 5%**

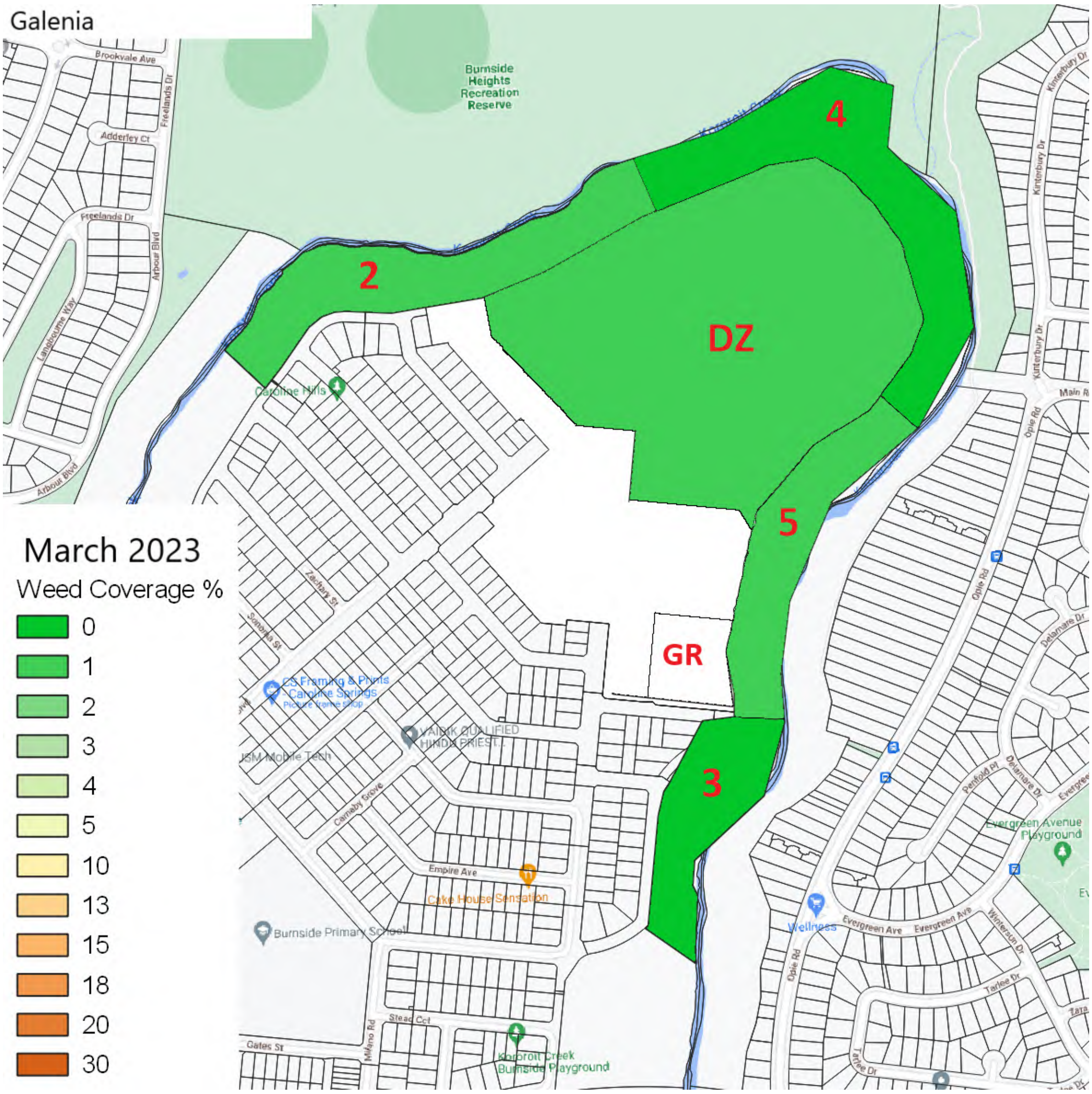
Current Coverage

Mgt Zone	2	4	5	3	DZ
March 2023	**1%**	**0%**	**1%**	**0%**	**1%**
September 2022	1%	0%	1%	0%	1%
June 2022	1%	0%	1%	0%	2%
March 2022	2%	0%	1%	1%	4%
December 2021	1%	1%	1%	1%	5%
October 2021	1%	1%	1%	1%	10%
August 2021	1%	1%	1%	1%	0%
Apr 2021	1%	1%	1%	1%	0%
Dec 2020	1%	1%	0%	1%	0%
Oct 2020	0%	0%	0%	1%	0%
June 2020	1%	0%	1%	0%	0%
April 2020	1%	0%	0%	1%	0%
Dec 2019	2%	1%	1%	1%	1%

This perennial creeping, herbaceous plant growing to about 60 cm high and 1–2 m wide.

It is deep rooted and flowers from late spring to early autumn. Galenia reproduces by seed. Most dispersal of seed occurs by wind, water, birds and livestock. Movement of contaminated soil by vehicles and equipment can also contribute to its spread.

Drought and salt tolerant, galenia grows over and smothers existing vegetation by forming a thick dense mat. It invades coastal dunes, pastures, disturbed areas, lawns, roadsides and rocky outcrop vegetation. Galenia is known to produce nitrates that can be toxic to stock.


Galenia
Burnside Heights Recreation Reserve
2
4
DZ
5
GR
3
March 2023
Weed Coverage %
0
1
2
3
4
5
10
13
15
18
20
30

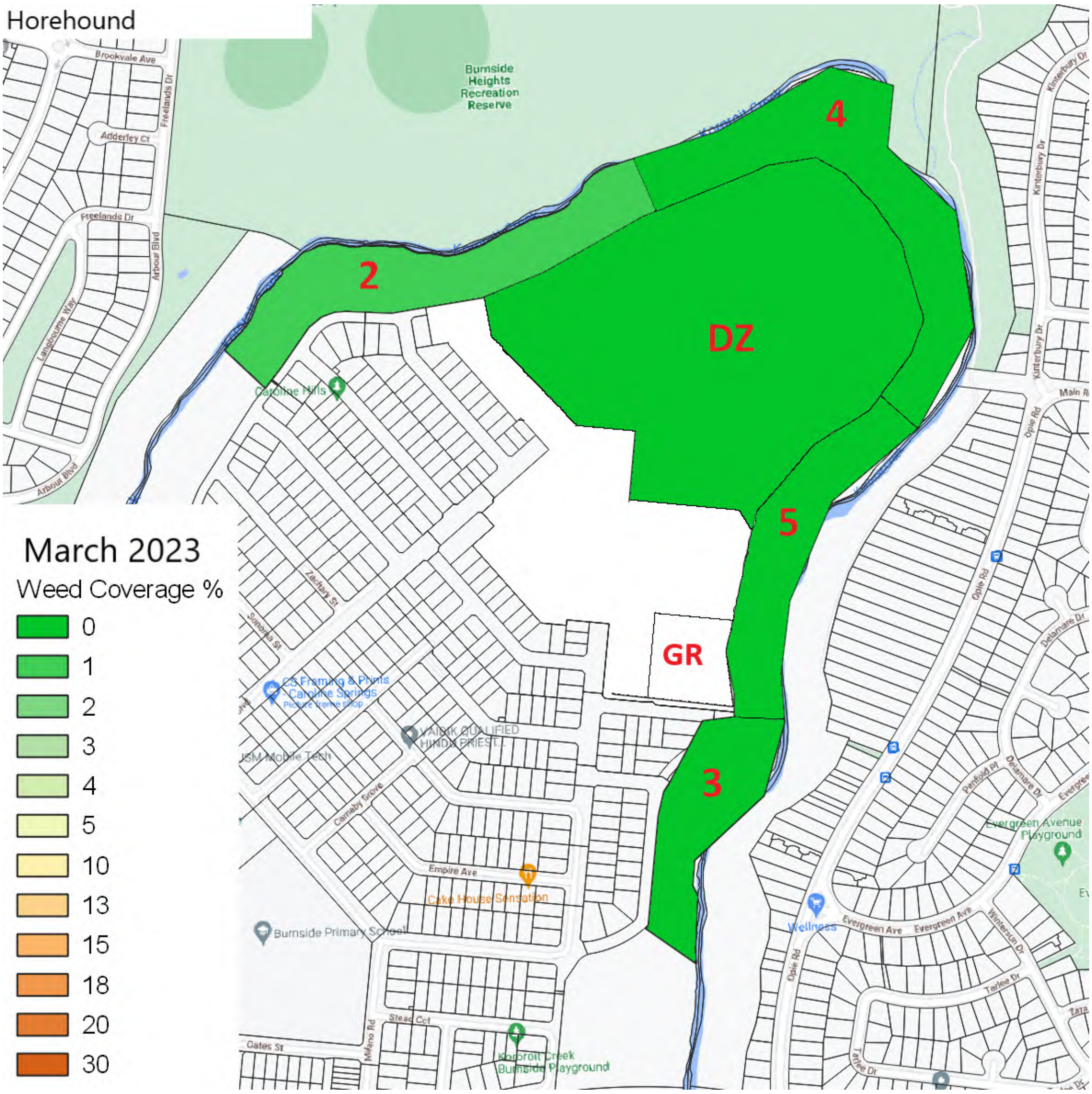
4.10 Horehound - Marrubim vulgare

Not declared or considered noxious **Target coverage <5%**

Current Coverage

Mgt Zone	2	4	5	3	DZ
March 2023	**1%**	**0%**	**0%**	**0%**	**0%**
September 2022	1%	0%	0%	0%	0%
June 2022	1%	0%	0%	0%	0%
March 2022	0%	1%	1%	0%	0%
December 2021	0%	0%	0%	0%	0%
October 2021	0%	1%	0%	4%	3%
August 2021	0%	1%	0%	1%	0%
Apr 2021	0%	1%	0%	1%	0%
Dec 2020	0%	1%	1%	1%	0%
Oct 2020	1%	0%	1%	0%	0%
June 2020	0%	1%	0%	1%	0%
April 2020	0%	1%	1%	0%	0%
Dec 2019	0%	0%	0%	0%	0%

A bushy perennial plant, 30 to 80 cm high, sharply aromatic when crushed, covered with dense whitish hairs. Horehound thrives on poor soil and in waste places. It invades poor pastures which provide little competition. Horehound contains a bitter alkaloid which makes it unpalatable for grazing livestock. As well as being an agricultural weed of pastures horehound has become an important environmental weed because of its ability to invade disturbed native vegetation.


Horehound
March 2023
Weed Coverage %
0
1
2
3
4
5
10
13
15
18
20
30
2
4
DZ
5
GR
3
Burnside Heights Recreation Reserve

4.11 Paterson's Curse - Echium plantagineum

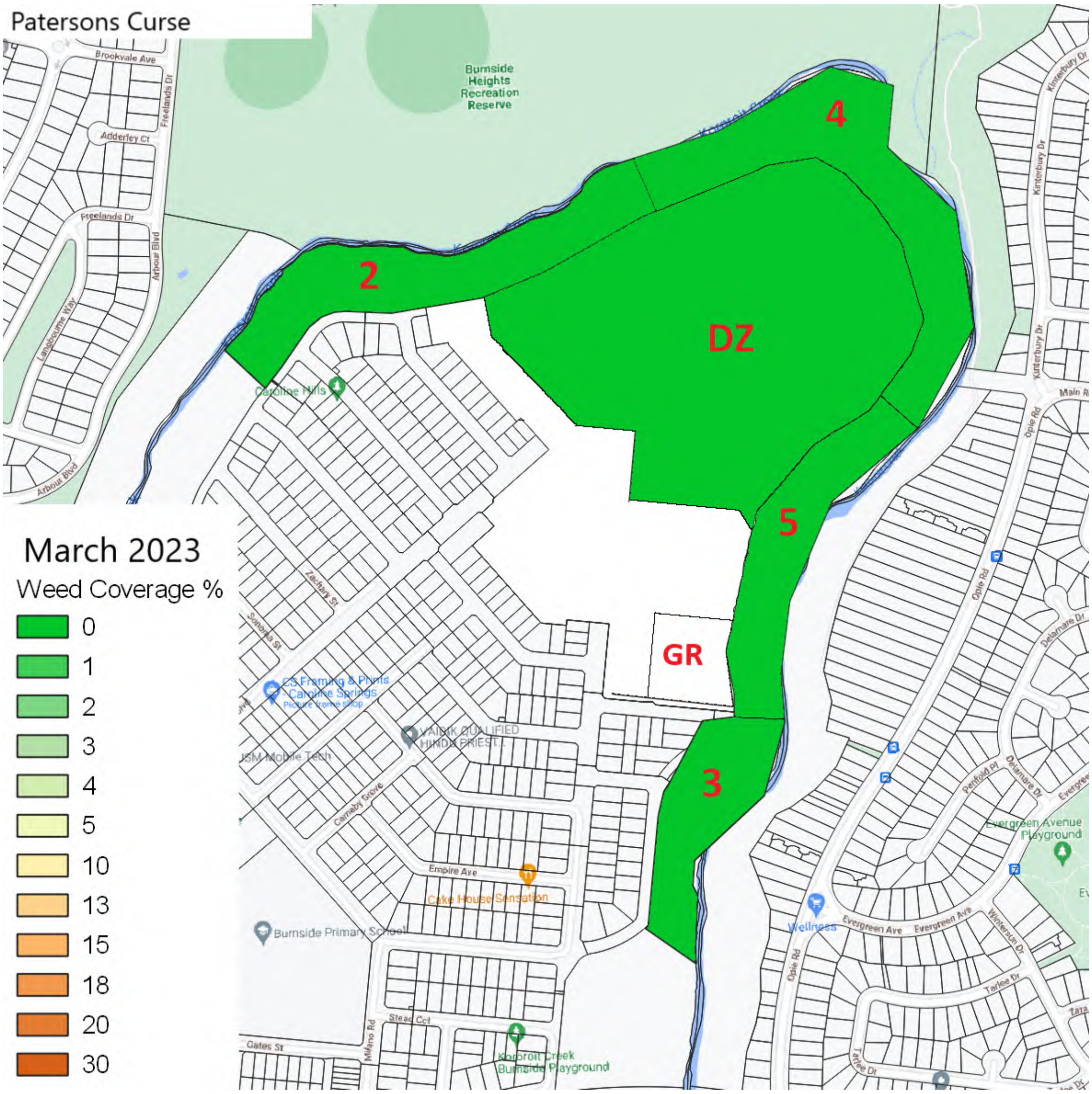
Regionally controlled **Target coverage < 5%**

Current Coverage

Mgt Zone	2	4	5	3	DZ
March 2023	**0%**	**0%**	**0%**	**0%**	**0%**
September 2022	0%	0%	0%	0%	0%
June 2022	0%	0%	0%	0%	0%
March 2022	2%	0%	0%	2%	2%
December 2021	0%	0%	0%	0%	0%
October 2021	0%	0%	0%	0%	10%
August 2021	0%	0%	0%	2%	10%
Apr 2021	0%	0%	0%	0%	0%
Dec 2020	1%	1%	1%	1%	2%
Oct 2020	2%	1%	1%	2%	2%
June 2020	2%	2%	5%	5%	5%
April 2020	5%	10%	5%	5%	10%
Dec 2019	5%	1%	2%	2%	2%

Paterson's curse is an annual, occasionally biennial, herb that grows as a rosette in autumn and winter and produces flowering stalks in spring and early summer. The rosette usually grows parallel to the ground; however, the leaves may be erect in dense vegetation.

Plants begin to produce flowering stalks in late winter, commence flowering in early spring and die in summer. The flowers are usually purple but may be blue or pink. The first mature seeds are produced four to six weeks after flowering commences.


Patersons Curse
Burnside Heights Recreation Reserve
4
2
DZ
5
GR
3
March 2023
Weed Coverage %
0
1
2
3
4
5
10
13
15
18
20
30

4.12 Prickly Pear - Opuntia spp.

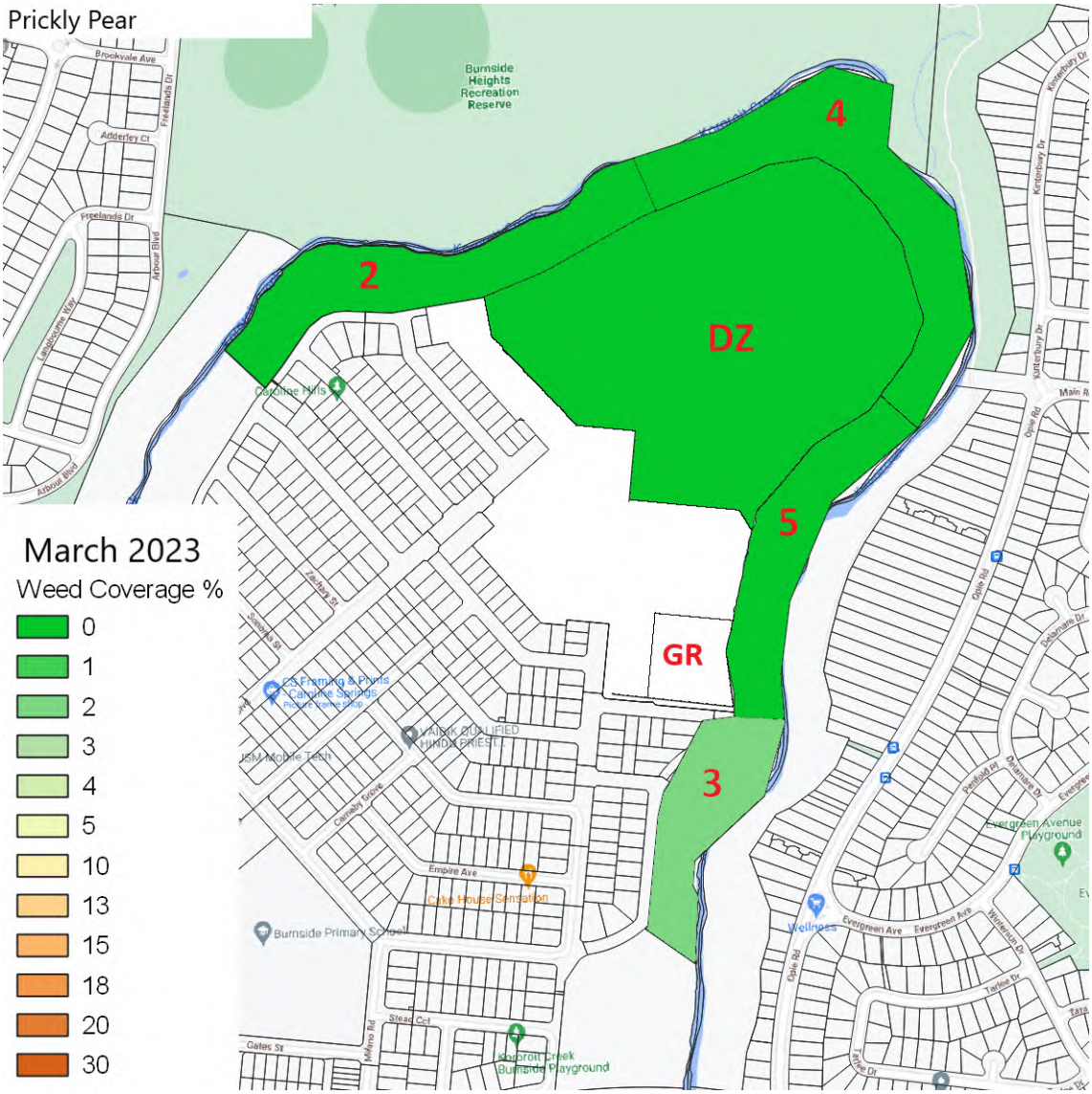
Regionally controlled **Target coverage <5%**

Current Coverage

Mgt Zone	2	4	5	3	DZ
March 2023	**0%**	**0%**	**0%**	**2%**	**0%**
September 2022	0%	0%	0%	1%	0%
June 2022	0%	0%	0%	1%	0%
March 2022	0%	0%	0%	0%	0%
December 2021	0%	0%	0%	0%	0%
October 2021	0%	0%	0%	1%	0%
August 2021	0%	1%	0%	1%	0%
Apr 2021	0%	1%	0%	1%	0%
Dec 2020	0%	1%	0%	1%	0%
Oct 2020	0%	1%	0%	1%	0%
June 2020	0%	1%	0%	0%	0%
April 2020	0%	1%	0%	1%	0%
Dec 2019	0%	1%	1%	1%	0%

Prickly pear is an erect succulent shrub which can grow to a height of 5 m. The stems of prickly pear are commonly grey green to light green. The plant usually has one main woody stem with dense prickles, which gives way to several side branches made up of fleshy segments. The segments are approximately 45 cm long, 15 cm wide and 1-2 cm thick, with the upper segments appearing to droop.

Each plant segment has areoles, which are growing points where new segments, flowers or roots can be produced. Each areole has short tuffs of finely barbed bristles and sometimes one to five sharp, 5 cm long spines. Spines are more common on segments that are older and lower on the plant.


Prickly Pear
March 2023
Weed Coverage %
0
1
2
3
4
5
10
13
15
18
20
30
4
2
DZ
5
GR
3
Burnside Heights Recreation Reserve
Brockvale Ave
Adderley Ct
Freelands Dr
Arbour Blvd
Heathcote Way
Caroline Hills
Kintbury Dr
Main R
Oxlade Rd
Debenare Dr
Penfold Pl
Evergreen Avenue Playground
Evergreen Ave
Wentworth Dr
Tarlee Dr
Wellness
Empire Ave
Cake House Sensation
Burnside Primary School
Stead Cct
Gates St
Millimo Rd
Ironbroft Creek Burnside Playground
Ramsay St
Stephens St
Carnaby Grove
CS Framing & Prints Caroline Springs
Picture Frame Shop
JSM Mobile Tech

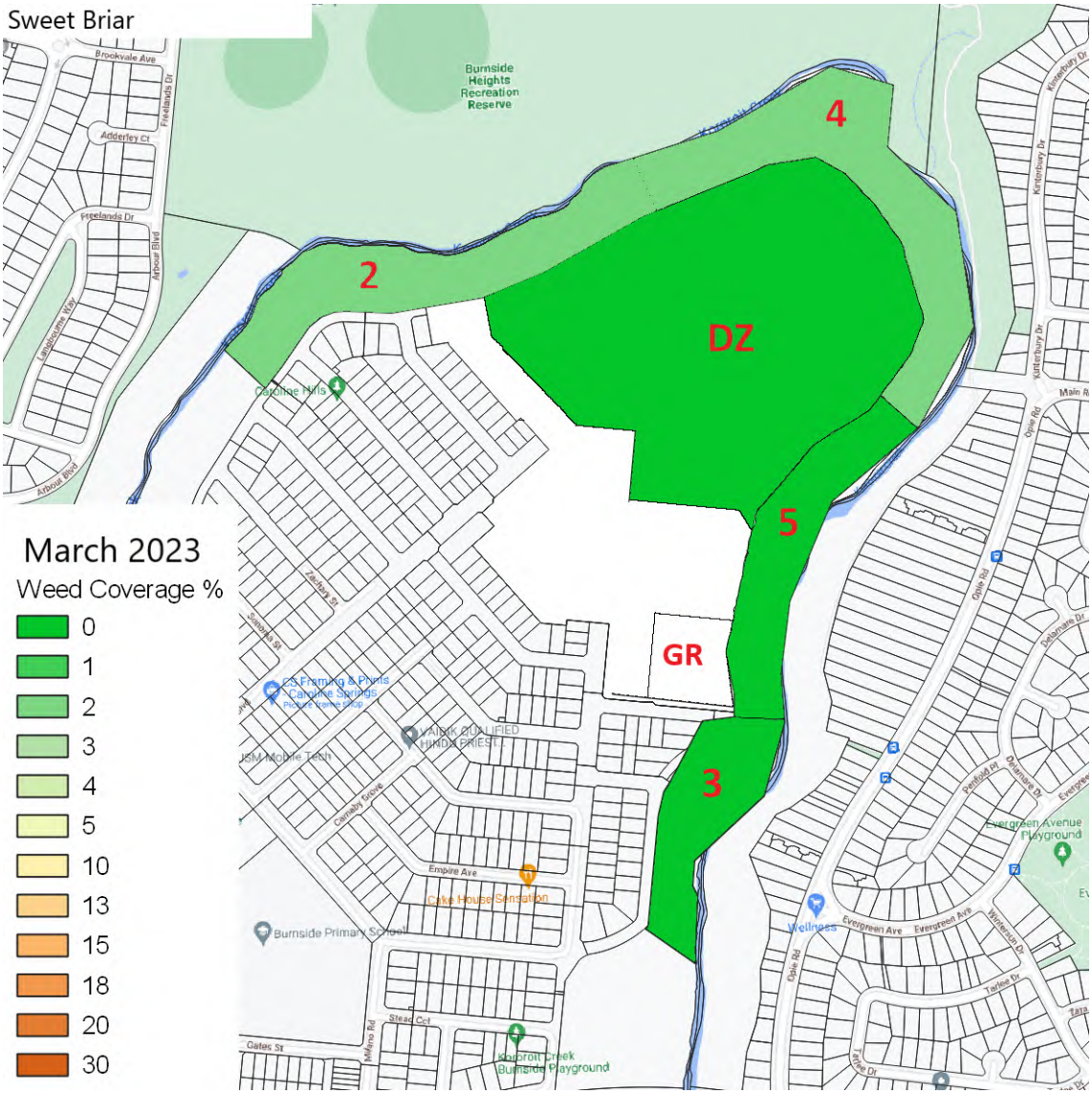
4.13 Sweet Briar - Rosa rubiginosa

Regionally Controlled **Target coverage <1%**

Current Coverage

Mgt Zone	2	4	5	3	DZ
March 2023	**2%**	**2%**	**0%**	**0%**	**0%**
September 2022	0%	0%	0%	0%	0%
June 2022	0%	0%	0%	0%	0%
March 2022	0%	2%	0%	0%	1%
December 2021	0%	0%	0%	0%	1%
October 2021	1%	1%	1%	1%	1%
August 2021	1%	1%	1%	1%	1%
Apr 2021	1%	1%	1%	1%	1%
Dec 2020	1%	1%	0%	0%	0%
Oct 2020	1%	1%	0%	0%	0%
June 2020	1%	1%	1%	0%	0%
April 2020	1%	1%	0%	1%	0%
Dec 2019	1%	1%	0%	1%	0%

Sweet briar is a perennial woody shrub up to 3m tall. The stem is usually many (and can be up to several hundred) stems arising from the rootstock; erect or scrambling, up to 3 metres high, green and smooth to brown and somewhat roughened, woody, branched, spreading and sometimes trailing, heavily covered with down-curved prickles up to 1.5 cm long.


Sweet Briar
Burnside Heights Recreation Reserve
4
2
DZ
5
GR
3
March 2023
Weed Coverage %
0
1
2
3
4
5
10
13
15
18
20
30
Burnside Primary School
Cake House Sensation
Evergreen Avenue Playground
Burnside Playground

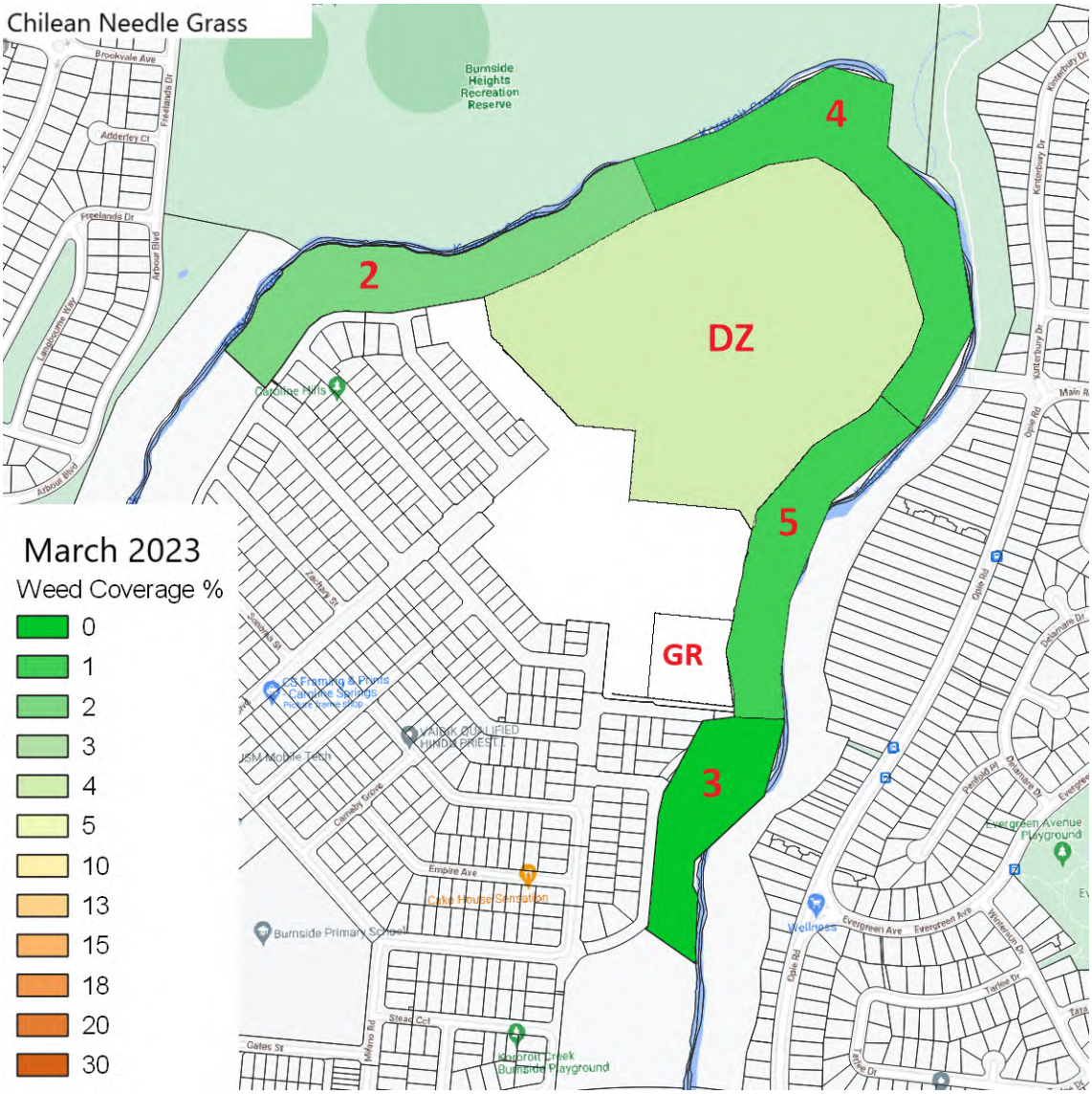
4. 14 Chilean Needle Grass - Nassella neesiana

Regional restricted **Target coverage < 5%**

Current Coverage

Mgt Zone	2	4	5	3	DZ
March 2023	**2%**	**1%**	**1%**	**0%**	**4%**
September 2022	2%	1%	0%	0%	4%
June 2022	2%	1%	0%	0%	5%
March 2022	5%	10%	5%	5%	15%
December 201	5%	5%	5%	5%	20%
October 2021	5%	3%	5%	5%	15%
August 2021	5%	3%	5%	5%	15%
Apr 2021	2%	2%	5%	5%	2%
Dec 2020	0%	0%	2%	2%	2%
Oct 2020	0%	0%	2%	5%	2%
June 2020	0%	0%	2%	1%	2%
April 2020	0%	0%	1%	5%	2%
Dec 2019	0%	0%	1%	5%	2%

Chilean needle grass is a tussocky perennial in the Spear grass group of grasses growing to about 1 m high. It leaves are hairless and are normally grow to 30 cm long and 5 mm wide. With the flowering head being to 40 cm long.


Chilean Needle Grass
March 2023
Weed Coverage %
0
1
2
3
4
5
10
13
15
18
20
30
Burnside Heights Recreation Reserve
4
2
DZ
5
GR
3
Caroline Hills
Burnside Primary School
Cake House Sensation
Wellness
Evergreen Avenue Playground
Burnside Playground

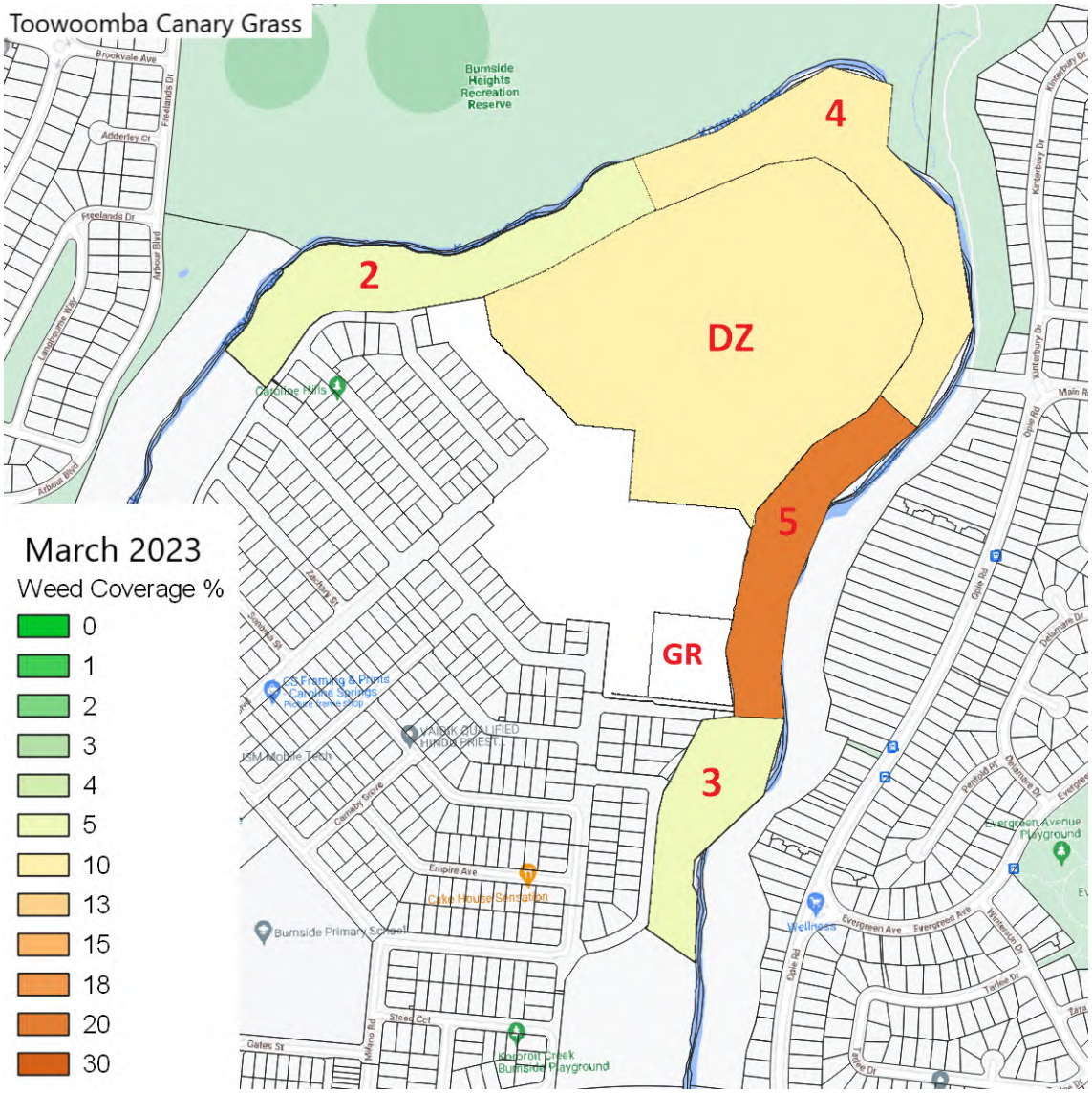
4.15 Toowoomba canary grass - Phalaris aqatica

Not declared and considered noxious **Target coverage < 5%**

Current Coverage

Mgt Zone	2	4	5	3	DZ
March 2023	**5%**	**10%**	**20%**	**5%**	**10%**
September 2022	10%	10%	15%	5%	10%
June 2022	10%	15%	20%	10%	15%
March 2022	20%	20%	20%	20%	20%
December 2021	25%	25%	20%	25%	30%
October 2021	15%	20%	20%	20%	4%
August 2021	13%	18%	20%	20%	4%
Apr 2021	5%	5%	5%	5%	2%
Dec 2020	2%	2%	2%	2%	0%
Oct 2020	5%	5%	5%	5%	0%
June 2020	2%	2%	2%	2%	0%
April 2020	2%	2%	2%	2%	0%
Dec 2019	1%	2%	5%	5%	5%

Widely used as a pasture species where annual rainfall exceeds 450 mm. It prefers fertile, seasonally moist sites. Commonly spreads from pastures, road verges and drainage ditches to adjacent indigenous vegetation. Toowoomba canary grass invades dry coastal vegetation, heathland and heathy woodland, lowland grassland and grassy woodland, dry sclerophyll forest and woodland, damp sclerophyll forest, riparian vegetation, and freshwater wetlands.


Toowoomba Canary Grass
March 2023
Weed Coverage %
0
1
2
3
4
5
10
13
15
18
20
30
4
2
DZ
5
GR
3
Burnside Heights Recreation Reserve
Caroline Hills
Burnside Primary School
Cake House Sensation
Evergreen Avenue Playground
Wellness
Koroforti Creek Burnside Playground

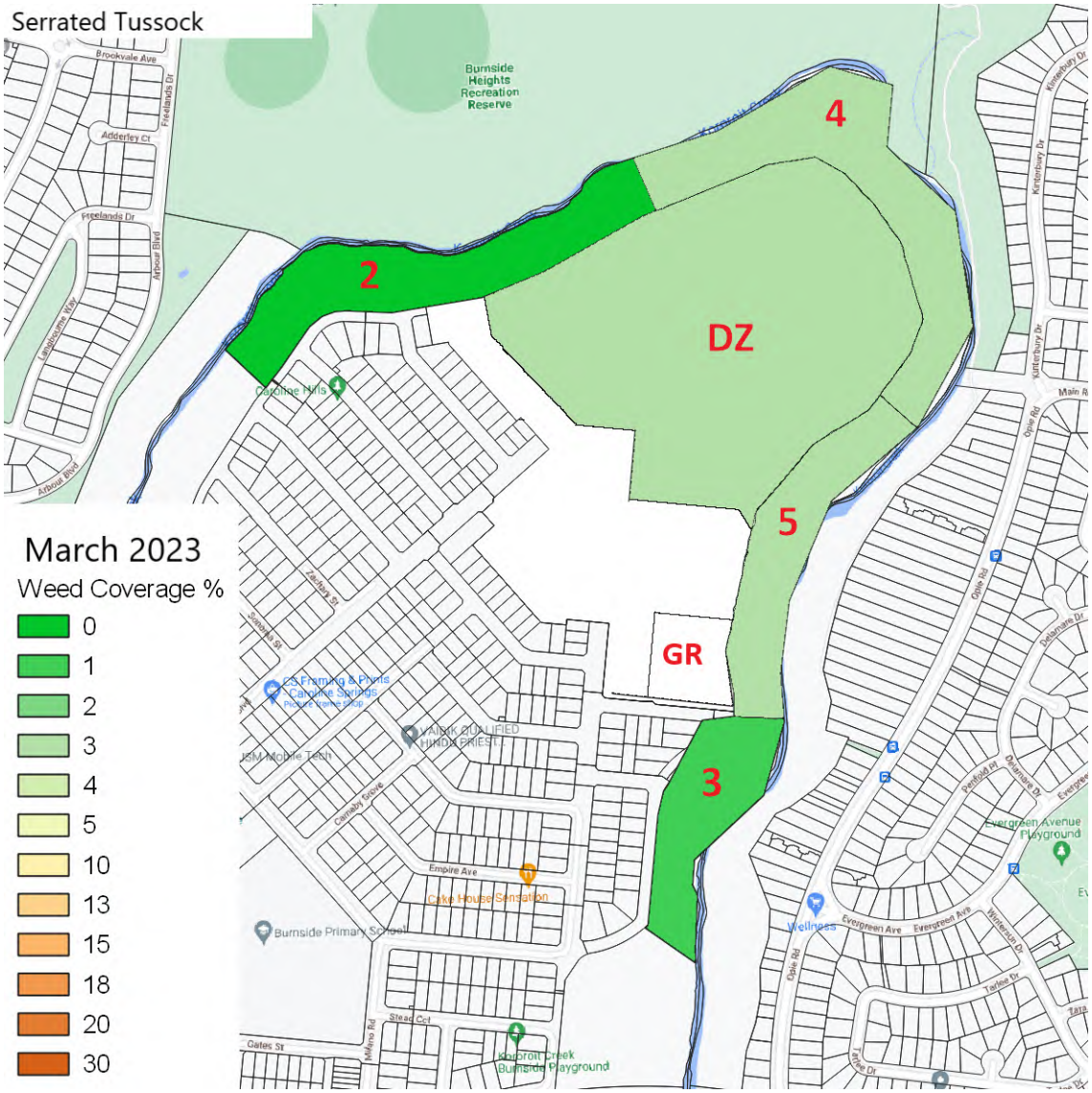
4.16 Serrated Tussock - Nassella trichotoma

Regionally Controlled - *Weed of National Significance* **Target coverage < 5%**

Current Coverage

Mgt Zone	2	4	5	3	DZ
March 2023	**0%**	**3%**	**3%**	**1%**	**3%**
September 2022	0%	1%	1%	1%	3%
June 2022	2%	5%	2%	2%	10%
March 2022	2%	10%	5%	5%	10%
December 2021	5%	10%	5%	5%	15%
October 2021	10%	15%	5%	10%	30%
August 2021	5%	15%	5%	10%	13%
Apr 2021	5%	5%	5%	5%	10%
Dec 2020	2%	2%	2%	2%	2%
Oct 2020	5%	5%	5%	2%	5%
June 2020	5%	5%	5%	2%	5%
April 2020	5%	5%	5%	2%	5%
Dec 2019	5%	5%	5%	5%	10%

Serrated tussock is a long-lived perennial grass growing up to 60cm in height with a base of 25cm in diameter. Plant size varies with soil fertility and location. In infertile conditions plants may only reach a height of 15cm. Serrated tussock is shallow rooted with an extensive network of fibrous roots occurring predominantly in the top 20cm of soil. The roots are dense, wiry, and fibrous making serrated tussock very difficult to pull out, even when small. Flowering stems emerge from the base of the plant. They are multi-branched and up to 35cm long. The purple colour of the small seeds produces an overall purplish haze to the serrated tussock seed head. Once the seeds have formed, the entire seed head will 'droop' over the tussock towards the ground. Flowering takes place as early as late winter (August) and will continue throughout the spring (September – November). Autumn flowering has been known to occur. Seeds take 8 – 10 weeks to mature, normally occurring throughout the spring and summer months. Once seeds are ripe, the whole flowing stem detaches from the base of the plant and is dispersed by the wind. Seed is dormant and will not germinate for about 6 months.

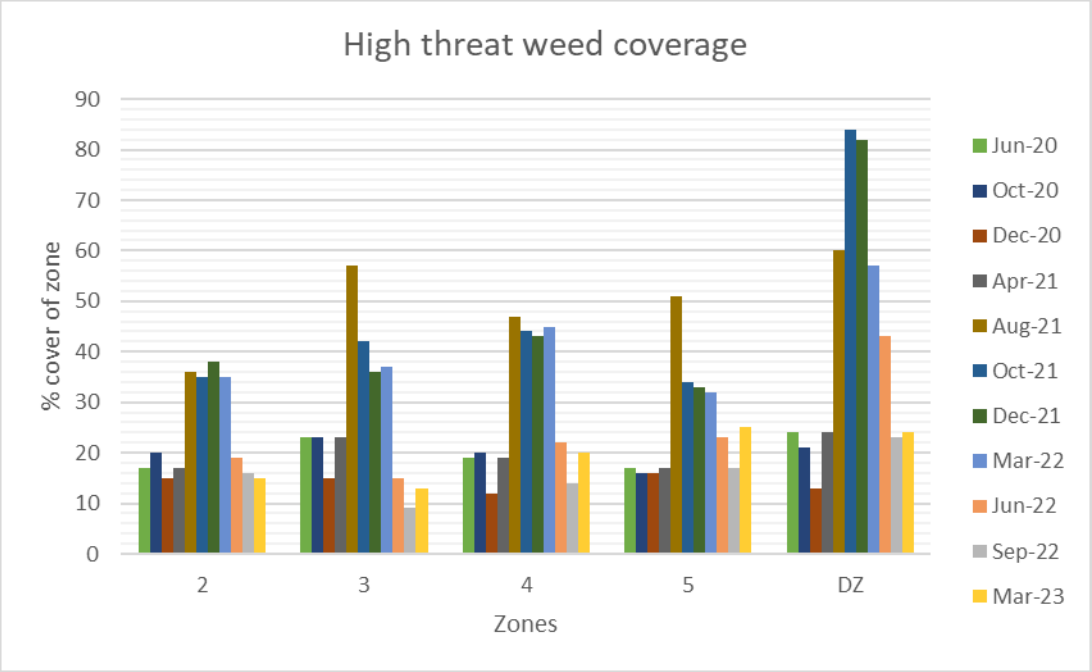

Serrated Tussock
March 2023
Weed Coverage %
0
1
2
3
4
5
10
13
15
18
20
30
4
2
DZ
5
GR
3
Burnside Heights Recreation Reserve
Caroline Hills
Burnside Primary School
Cake House Sensation
Evergreen Avenue Playground
Wellness
Kororoit Creek Burnside Playground

6.0 Summary

6.1 Overview

The below table displays the total percentage coverage in each zone of high threat weeds. Since the previous report there has been the slightest increase in the overall coverage of high threat weeds across most zones, due to Spring growth and a cooler summer period. During this visit, it was noted that *Phalaris aquatica* (Toowoomba Canary Grass) has become the most dominant species throughout most zones.

Approximately 60% of the development zone is now under construction and 50% of Zone 3 and Zone 2 has also been developed.



6.2 Zone 2

This zone is currently being developed by landscapers which will reduce the zone by 50%. The zone is becoming less dominated by the highly invasive large grass *Phalaris aquatica*. Removal of the species is being done slowly, concentrating on the areas of higher vegetation value outwards to allow the natural regeneration of the newly opened areas without significantly increasing the chances of erosion.

As previously noted, all woody weeds have been controlled, with a limited number of small specimens on the site.

6.3 Zone 4

This zone is becoming less dominated by the highly invasive large grass *Phalaris aquatica*. Future removal of the species should be done slowly, concentrating from the areas of higher vegetation value outwards to allow the natural regeneration of the newly opened areas without significantly increasing the chances of invasion by other unfavourable species such as one of the *Nasella sp*. on site. With the open areas where previous Phalaris have been controlled, a few specimens of *Nassella trichotoma have emerged.*

All woody weeds had been controlled, with a limited number of specimens counted across the site. A small patch of Century Plant *(Agave Americana)* is starting to take hold.

6.4 Zone 5

There has been a slight increase by the highly invasive large grass *Phalaris aquatica*. Future removal of the species should be done slowly, concentrating from the areas of higher vegetation value outwards to allow the natural regeneration of the newly opened areas without significantly increasing the chances of invasion by other unfavourable species such as one of the *Nasella sp*. on site.

All woody weeds have been controlled, with a limited number of specimens counted across the site.

6.5 Zone 3

This becoming less dominated by the by the highly invasive large grass *Phalaris aquatica*. Future removal of the species should be done slowly, concentrating from the areas of higher vegetation value outwards to allow the natural regeneration of the newly opened areas without significantly increasing the chances of invasion by other unfavourable species such as one of the *Nasella sp*. on site. Civil works has commenced along the roadside of this zone reducing the area by about 20%. There is one Prickly Pear *(Opuntia spp.)* located on the vertical ledge.

6.7 Development zone

This area varies significantly, with patches dominated by the native Kangaroo and Wallaby grass and others previously dominated by Serrated Tussock, now dominated by *Phalaris aquatica*. Also, various patches of Artichoke Thistle (*Cynara cardunculus) are* starting to dominate. Although the numbers are starting to decrease with weed management control and increasing development.

7.0 Conclusion

A low prevalence of herbaceous high threat weeds (Spear Thistle, Fennel, Cape weed or Paterson's Curse) and slow decline of the *Phalaris aquatica* but still the dominant weed in various zones. *Phalaris aquatica* plants along the creek line have remained untreated for the last several visits. They have been left to reduce the risk of erosion concerns.

Rather than a widespread herbicide treatment, future slashing regimes, interspersed with selective treatments where individuals and or small stands are near higher vegetation values may be a better path moving forward. This has and shall continue to be incorporated into the future treatment regime.

The considerable number of Artichoke Thistles (*Cynara cardunculus)* in the Development zone has been reduced and further control is required to prevent spread to other zones.

Weed Survey Report

Modeina Estate - Phase 2 -

September 2023

Submitted by Adam Gallagher

Australian Ecosystems Pty Ltd

Phone: 0429 453 396

Email: adamg@australianecosystems.com.au

Contents

1.0 Introduction

Australian Ecosystems (AE) has prepared this report for Dennis Family Corporation (Project Management) Pty Ltd. This report details the results of weed surveys conducted in September 2023 within the area described as 'Stage 2 Modeina'. This report should be read in conjunction with, 'Modeina Weed Management Strategy' that Greening Australia prepared in 2017.

2.0 Weeds Surveyed

This survey has captured these weed species listed below:

- African Boxthorn *(Lycium ferocissimum)*
- Artichoke Thistle (*Cynara cardunculus)*
- Spear Thistle *(Cirsium vulgare)*
- Bridal Creeper *(Asparagus asparagodies)*
- Cape weed (*Arctotheca calendula)*
- Century Plant *(Agave Americana)*
- Fennel *(Foeniculum vulgare)*
- Galenia *(Galenia pubescens)*
- Horehound *(Marrubim vulgare)*
- Paterson's Curse *(Echium plantagineum)*
- Prickly Pear *(Opuntia spp.)*
- Sweet Briar *(Rosa rubiginosa)*
- Chilean Needle Grass *Nassella neesiana)*
- Toowoomba canary grass *(Phalaris aquatica)*
- Serrated Tussock *(Nassella trichotoma)*

Determined by:

The weeds detailed within this report have been taken from the Modeina Weed Management Strategy that Greening Australia prepared in 2017. Only species that are widespread and/or have a high level of risk have been chosen to be controlled within these areas.

3.0 Survey Methodology

The above-mentioned species were surveyed using the Random Quadrant Sampling Method. Within each zone, four quadrants 5-meter X 5-meter were used to measure the current number of weed species present and then converted to a percentage cover. The results from these quadrants were then extrapolated to obtain a percentage cover across each of the zones. The results of these surveys are displayed over the following pages of the report.

3.1 Woody weeds

For this survey woody weeds are classified as African Boxthorn *(Lycium ferocissimum)*, Century Plant *(Agave Americana),* Fennel *(Foeniculum vulgare),* Prickly Pear *(Opuntia spp.)* and Sweet Briar *(Rosa rubiginosa)*.

As a result of the extremely low abundance of all species in each zone, individual counts were undertaken, with each individual being assigned a percentage cover value of 2% to project maximum canopy coverage once mature. It is noteworthy that the observed species were primarily in their juvenile stage, with a projected canopy cover of less than 2% of 25m2. In Zone 3, a limited cluster of Prickly Pear (Opuntia spp.) is experiencing a decline in regrowth with each treatment. Similarly, in Zone 4, only a few patches of the Century Plant (Agave Americana) remain, and they, too, are experiencing a reduction in regrowth.

3.2 Herbs and Grass Weeds

Herb and grass weeds are reduced across all zones. These weeds include Artichoke Thistle (*Cynara cardunculus)*, Scotch Thistle *(Onopordum acanthium),* Spear Thistle *(Cirsium vulgare),* Bridal Creeper *(Asparagus asparagodies),* Cape weed (*Arctotheca calendula),* Galenia *(Galenia pubescens),* Horehound *(Marrubim vulgare),* Paterson's Curse *(Echium plantagineum),* Chilean Needle Grass *Nassella neesiana),* Toowoomba canary grass *(Phalaris aquatica)* and Serrated Tussock *(Nassella trichotoma).* There are still some large pockets of Toowoomba canary grass *(Phalaris aquatic),* but this also is reducing in numbers and will be reduced even further during further maintenance visits.

3.3 Changes

Construction work is ongoing within the development zone, which has resulted in a reduction of approximately 65% of the area surveyed. Recent works along the roadside of Zone 3, has resulted in a 50% reduction of the area, and along the road edge in Zone 2, also reducing the area by 50%. These planned construction works do not affect the survey results of this or any previous survey.

4.0 Details of Surveyed Weeds

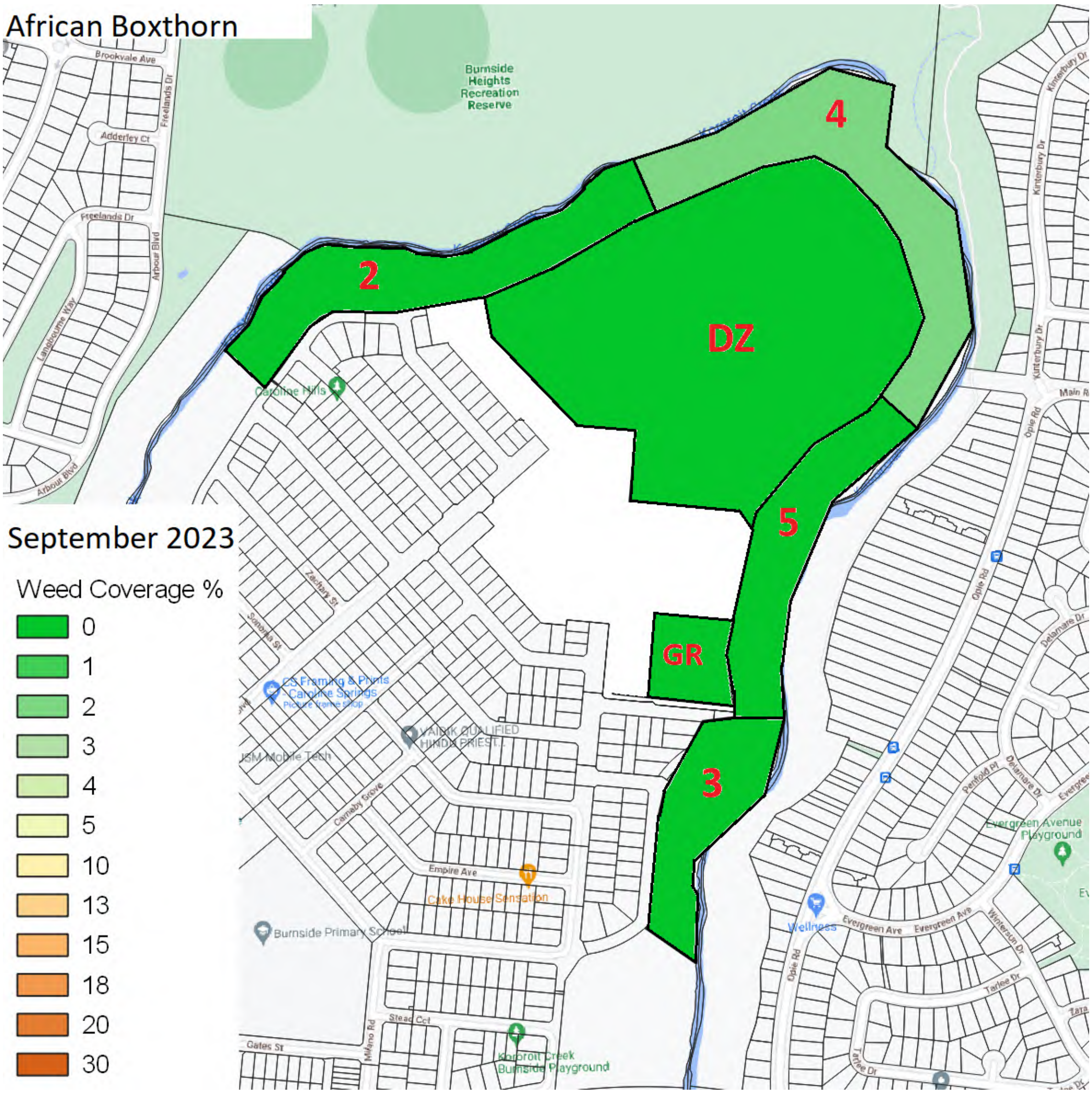
4.1 African Boxthorn - Lycium ferocissimum

Regionally Controlled & Weed of National Significance **Target coverage <1%**

Current coverage

Mgt Zone	2	4	5	3	DZ
September 2023	**0%**	**2%**	**0%**	**0%**	**0%**
June 2023	0%	1%	0%	2%	0%
March 2023	0%	0%	0%	2%	2%
September 2022	0%	0%	0%	1%	1%
June 2022	0%	0%	0%	1%	1%
March 2022	0%	1%	0%	0%	1%
December 2021	0%	0%	0%	0%	1%
October 2021	0%	0%	0%	0%	1%
August 2021	1%	1%	1%	1%	2%
April 2021	1%	1%	1%	1%	1%
Dec 2020	0%	1%	1%	0%	1%
Oct 2020	0%	1%	1%	0%	1%
June 2020	0%	1%	1%	0%	1%
April 2020	0%	1%	1%	0%	1%
Dec 2019	0%	1%	1%	0%	1%

African boxthorn is a rounded, woody, densely branched and very thorny large shrub up to 5 metres high. African boxthorn reproduces exclusively by seed, which is commonly eaten by birds, seed is viable when excreted. These plants are often found near places where birds have perched such as trees, poles, and powerlines. It was widely planted as a hedge plant before its weedy potential was realised. Spread also occurs from contaminated produce and materials. African boxthorn is a fast-growing invasive species that, if untreated, spreads quickly. Seeds may germinate year-round and early root growth is rapid, ensuring young plants are competitive. Plants take at least two years to flower, producing flowers and fruit mostly in summer. Some flowering and fruit production occurs at other times of year. Sometimes deciduous in winter, with new leaves and active growth in spring. Broken roots and cut stumps can sprout regrowth.



African Boxthorn
September 2023
Weed Coverage %
0
1
2
3
4
5
10
13
15
18
20
30
2
4
DZ
5
GR
3
Burnside Heights Recreation Reserve

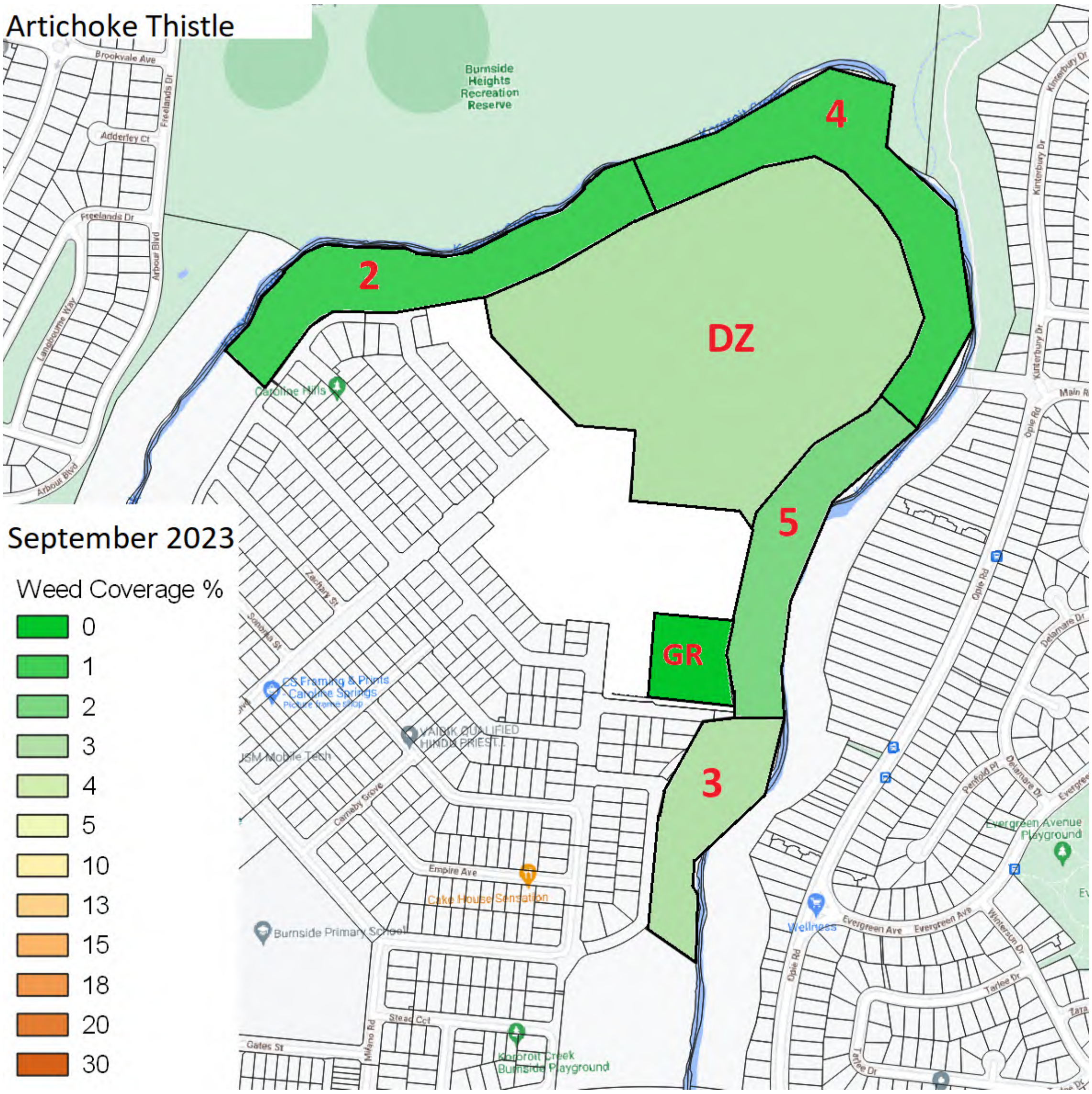
4.2 Artichoke Thistle - Cynara cardunculus

Regionally Controlled **Target coverage < 5%**

Current coverage

Mgt Zone	2	4	5	3	DZ
September 2023	**1%**	**1%**	**2%**	**3%**	**3%**
June 2023	2%	1%	2%	2%	4%
March 2023	3%	1%	0%	3%	4%
September 2022	1%	0%	0%	1%	4%
June 2022	1%	0%	0%	1%	10%
March 2022	2%	0%	0%	2%	2%
December 2021	0%	0%	0%	0%	5%
October 2021	0%	0%	0%	0%	10%
August 2021	5%	2%	15%	15%	10%
Apr 2021	15%	2%	2%	2%	5%
Dec 2020	5%	2%	5%	2%	5%
Oct 2020	5%	5%	2%	2%	10%
June 2020	2%	10%	5%	5%	10%
April 2020	25%	20%	15%	20%	20%
Dec 2019	10%	15%	15%	5%	15%

A perennial or biennial spiny thistle with annual tops and a cluster of large bright purple flowers that are 5-8 cm in diameter during summer. The mature plant is erect, with stems 1- 2 m tall arising from a bushy rosette up to 2 m wide and tall. The stem is strongly ribbed and covered with downy grey hairs and usually single at the base and branched towards the top. The large, grey green leaves are deeply lobed and spiny with woolly hairs underneath.


Artichoke Thistle
September 2023
Weed Coverage %
0
1
2
3
4
5
10
13
15
18
20
30
2
4
DZ
5
GR
3
Burnside Heights Recreation Reserve

4.4 Spear Thistle - Cirsium vulgare

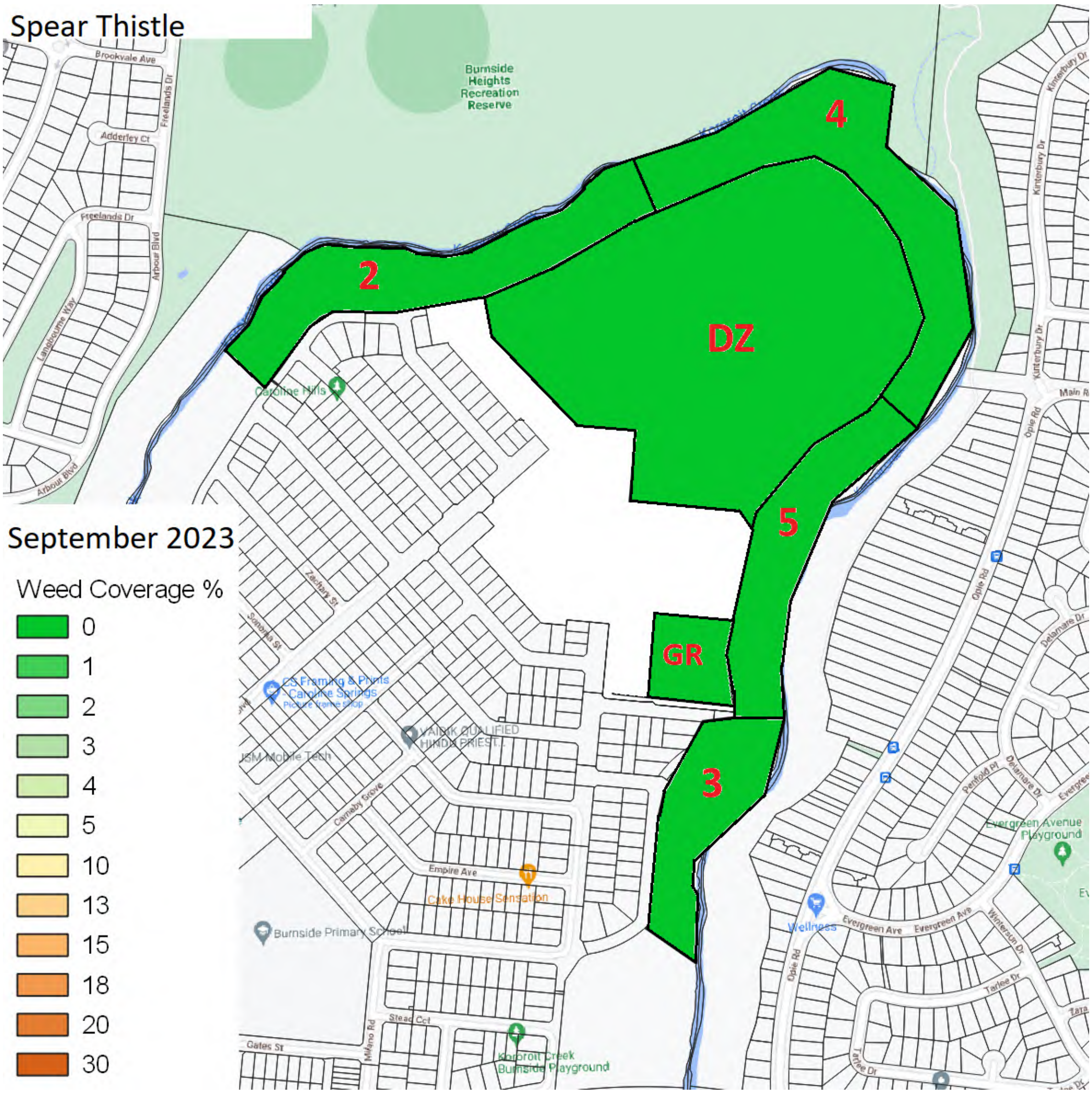
Regionally Controlled Weeds ***Target coverage <5%***

Current coverage

Mgt Zone	2	4	5	3	DZ
September 2023	**0%**	**0%**	**0%**	**0%**	**0%**
June 2023	0%	0%	0%	0%	0%
March 2023	0%	0%	0%	0%	0%
September 2022	0%	0%	0%	0%	0%
June 2022	0%	0%	0%	0%	0%
March 2022	0%	0%	0%	0%	0%
December 2021	0%	0%	0%	0%	0%
October 2021	0%	0%	0%	0%	0%
August 2021	0%	0%	0%	0%	0%
Apr 2021	0%	0%	0%	0%	0%
Dec 2020	1%	0%	0%	0%	1%
Oct 2020	1%	0%	0%	0%	1%
June 2020	1%	0%	0%	0%	1%
April 2020	1%	0%	0%	0%	1%
Dec 2019	2%	5%	1%	1%	1%

An annual or short-term perennial herb with erect growth to 1.5 m tall. Stems have spiny wings and are cobwebby. Upper leaf surface is dark green and rough while the lower surface is white with short, matted hairs.

A common species of wet or summer-moist land, including swamps, depressions, drains, wasteland, pastures, and cultivated soils. Prefers open, non-shaded environments, heavy textured soils, and good fertility.



Spear Thistle
September 2023
Weed Coverage %
0
1
2
3
4
5
10
13
15
18
20
30
2
4
DZ
5
GR
3
Burnside Heights Recreation Reserve

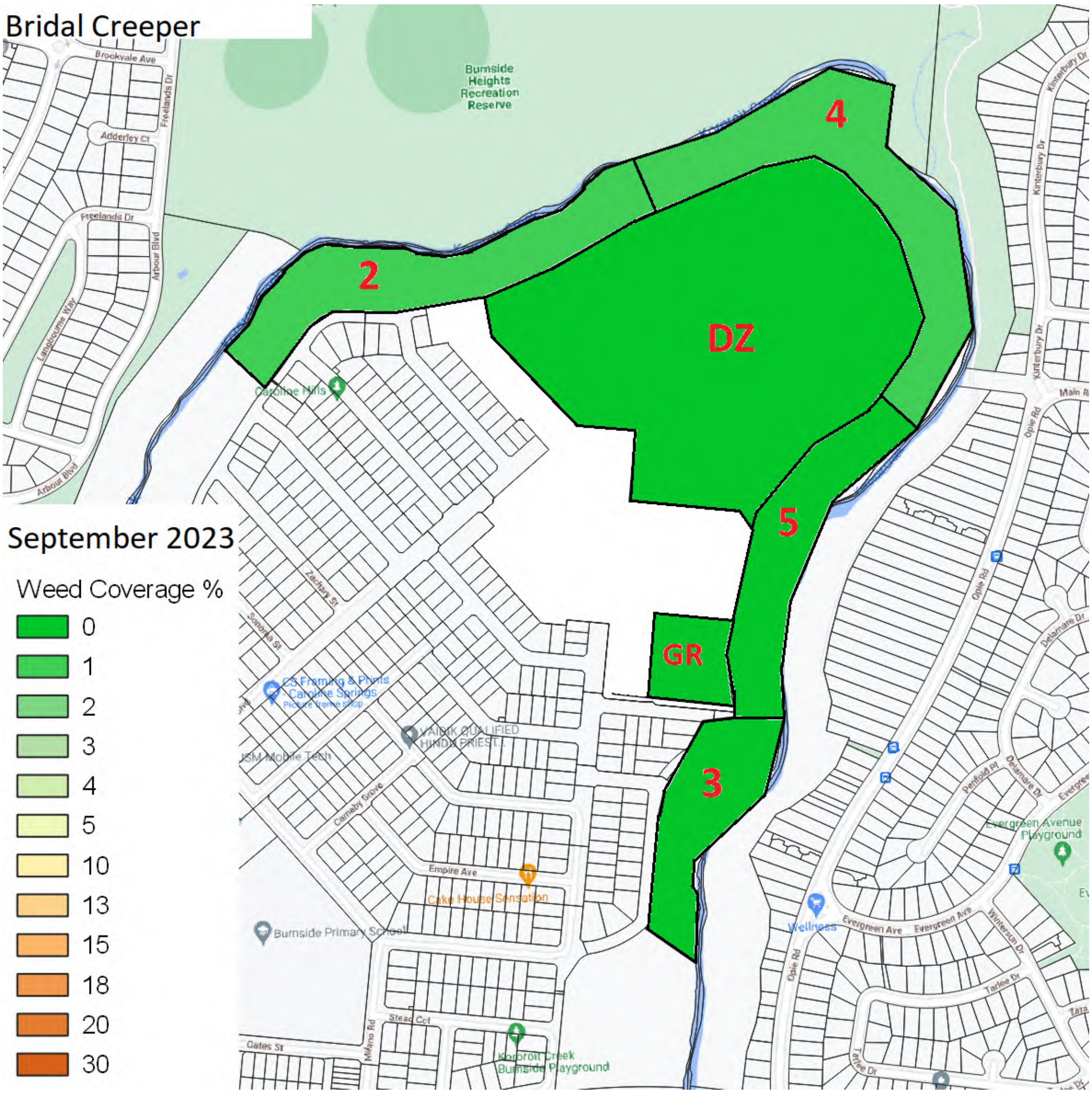
4.5 Bridal Creeper - Asparagus asparagodies

Regionally Controlled - Weed of National Significance **Target coverage < 1%**

Current Coverage

Mgt Zone	2	4	5	3	DZ
September 2023	**1%**	**1%**	**0%**	**0%**	**0%**
June 2023	1%	1%	0%	0%	0%
March 2023	1%	1%	0%	0%	0%
September 2022	1%	1%	0%	0%	0%
June 2022	1%	1%	0%	0%	0%
March 2022	2%	1%	0%	0%	0%
December 2021	2%	2%	2%	0%	0%
October 2021	3%	3%	2%	0%	0%
August 2021	5%	4%	3%	0%	0%
Apr 2021	1%	1%	1%	0%	0%
Dec 2020	0%	1%	1%	0%	0%
Oct 2020	0%	0%	1%	0%	0%
June 2020	0%	0%	1%	0%	0%
April 2020	0%	0%	1%	0%	0%
Dec 2019	0%	0%	0%	0%	0%

It is regarded as one of the worst weeds in Australia because of its invasiveness, potential for spread, and economic and environmental impacts. Bridal creeper entered the country as a garden plant and is now a major weed of bushland in southern Australia, where its climbing stems and foliage smother native plants. It forms a thick mat of underground tubers which impedes the root growth of other plants and often prevents seedling establishment. Rare native plants, such as the rice flower *Pimelea spinescens*, are threatened with extinction by Bridal Creeper.


Bridal Creeper
September 2023
Weed Coverage %
0
1
2
3
4
5
10
13
15
18
20
30
2
4
DZ
5
GR
3
Burnside Heights Recreation Reserve

4.6 Cape weed - Arctotheca calendula

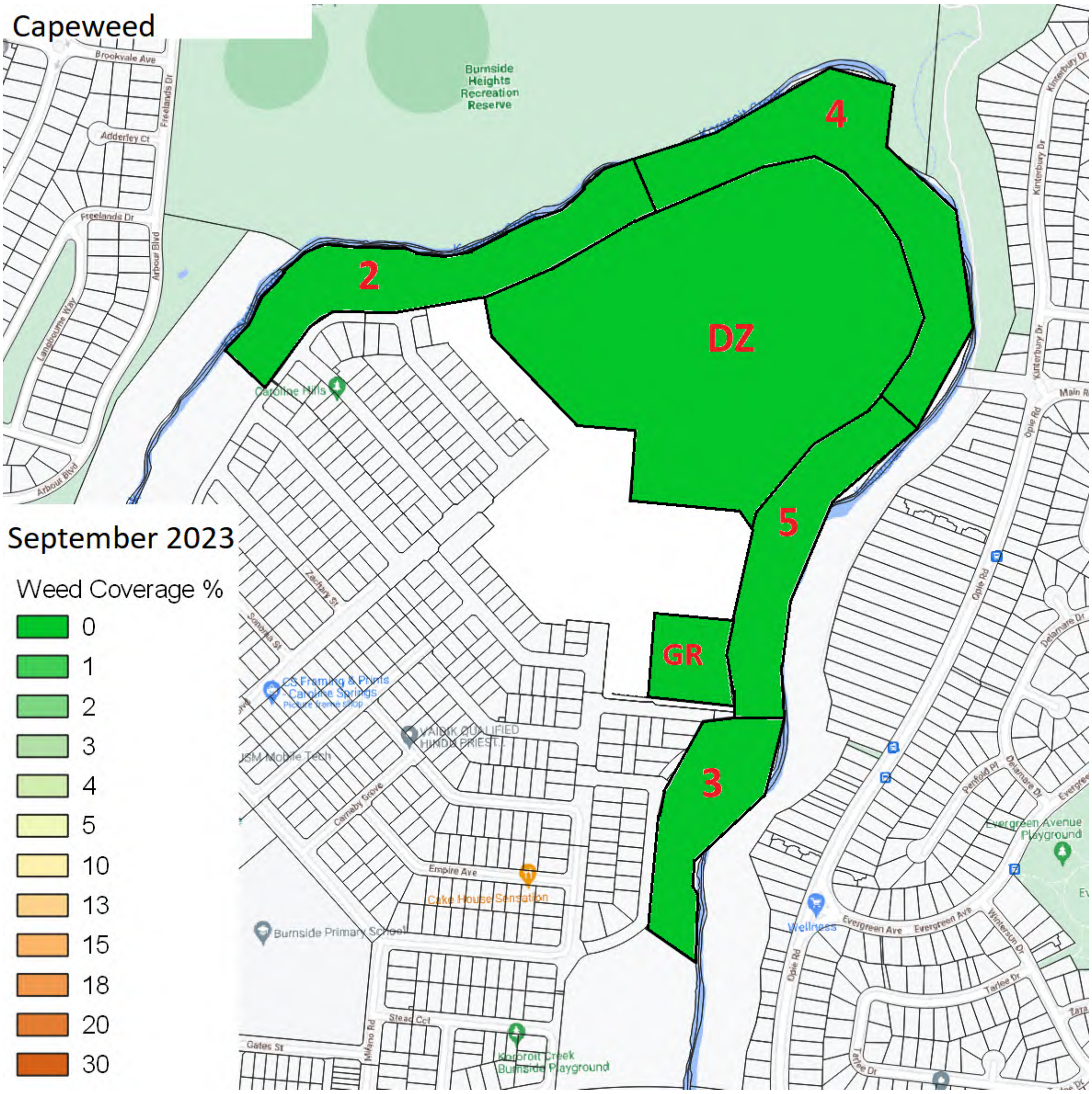
Not declared or considered noxious **Target coverage < 5%**

Current Coverage

Mgt Zone	2	4	5	3	DZ
September 2023	**0%**	**0%**	**0%**	**0%**	**0%**
June 2023	0%	0%	0%	0%	0%
March 2023	0%	0%	0%	0%	0%
September 2022	0%	0%	0%	0%	0%
June 2022	0%	0%	0%	0%	0%
March 2022	0%	0%	0%	2%	2%
December 2021	0%	0%	0%	0%	0%
October 2021	0%	0%	0%	0%	0%
August 2021	0%	0%	0%	0%	0%
Apr 2021	0%	0%	0%	0%	0%
Dec 2020	0%	0%	0%	0%	0%
Oct 2020	0%	1%	1%	1%	0%
June 2020	2%	2%	0%	2%	0%
April 2020	2%	2%	1%	2%	0%
Dec 2020	2%	2%	1%	2%	0%

This plant is widespread and common weed in pastures, lawns, cultivation, and waste areas across Victoria. Typically, a plant of fresh-water habitats but may occur on the fringes of saline swamps and flats during wetter periods.

It is stemless or shortly stemmed, herb, 80 cm wide and 30 cm high, with a taproot and a basal rosette of leaves. Leaves are 5-25 cm long and 2-6 cm wide.



Capeweed
September 2023
Weed Coverage %
0
1
2
3
4
5
10
13
15
18
20
30
2
4
DZ
5
GR
3
Burnside Heights Recreation Reserve

4.7 Century Plant - Agave americana

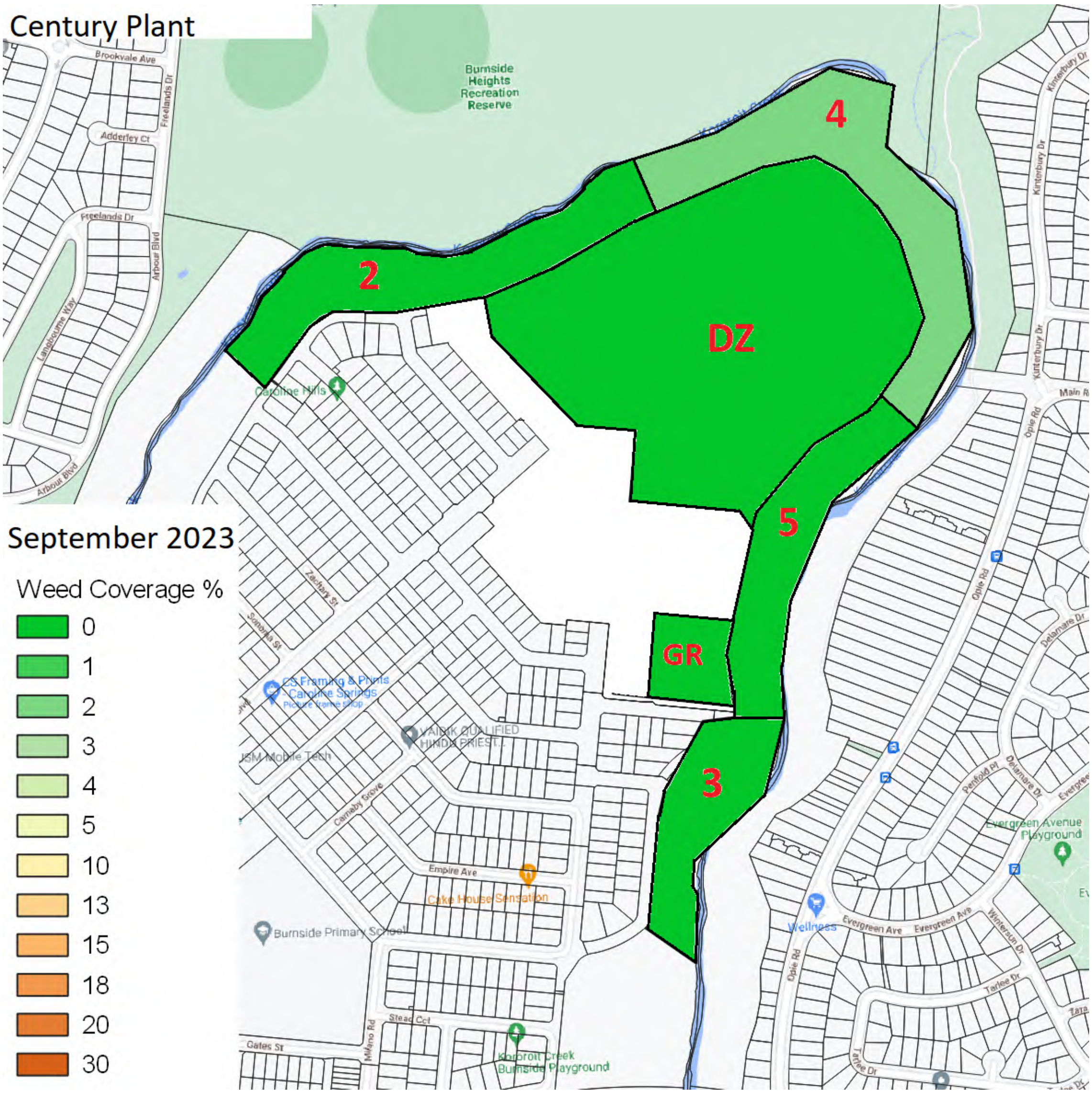
Not declared or considered noxious **Target coverage < 1%**

Current Coverage

Mgt Zone	2	4	5	3	DZ
September 2023	**0%**	**2%**	**0%**	**0%**	**0%**
June 2023	0%	2%	0%	0%	0%
March 2023	0%	2%	0%	0%	0%
September 2022	0%	1%	0%	0%	0%
June 2022	1%	0%	0%	0%	0%
March 2022	0%	0%	0%	0%	0%
December 2021	0%	0%	0%	0%	0%
October 2021	0%	0%	0%	0%	0%
August 2021	0%	0%	0%	0%	0%
Apr 2021	1%	0%	0%	0%	0%
Dec 2020	1%	0%	0%	0%	0%
Oct 2020	1%	0%	0%	0%	0%
June 2020	1%	0%	0%	0%	0%
April 2020	1%	0%	0%	0%	0%
Dec 2019	1%	0%	0%	0%	0%

A very large and long-lived rosette-forming plant, growing 1-2 m high and 2-4 m across.

Older individuals may sometimes develop a short woody stem at the base of the plant and commonly produces numerous suckers which form a large clump or colony. When fully mature this plant will develops a massive flower cluster on a robust flowering stem 6-12 m tall.



Century Plant
September 2023
Weed Coverage %
0
1
2
3
4
5
10
13
15
18
20
30
4
2
DZ
5
GR
3
Burnside Heights Recreation Reserve

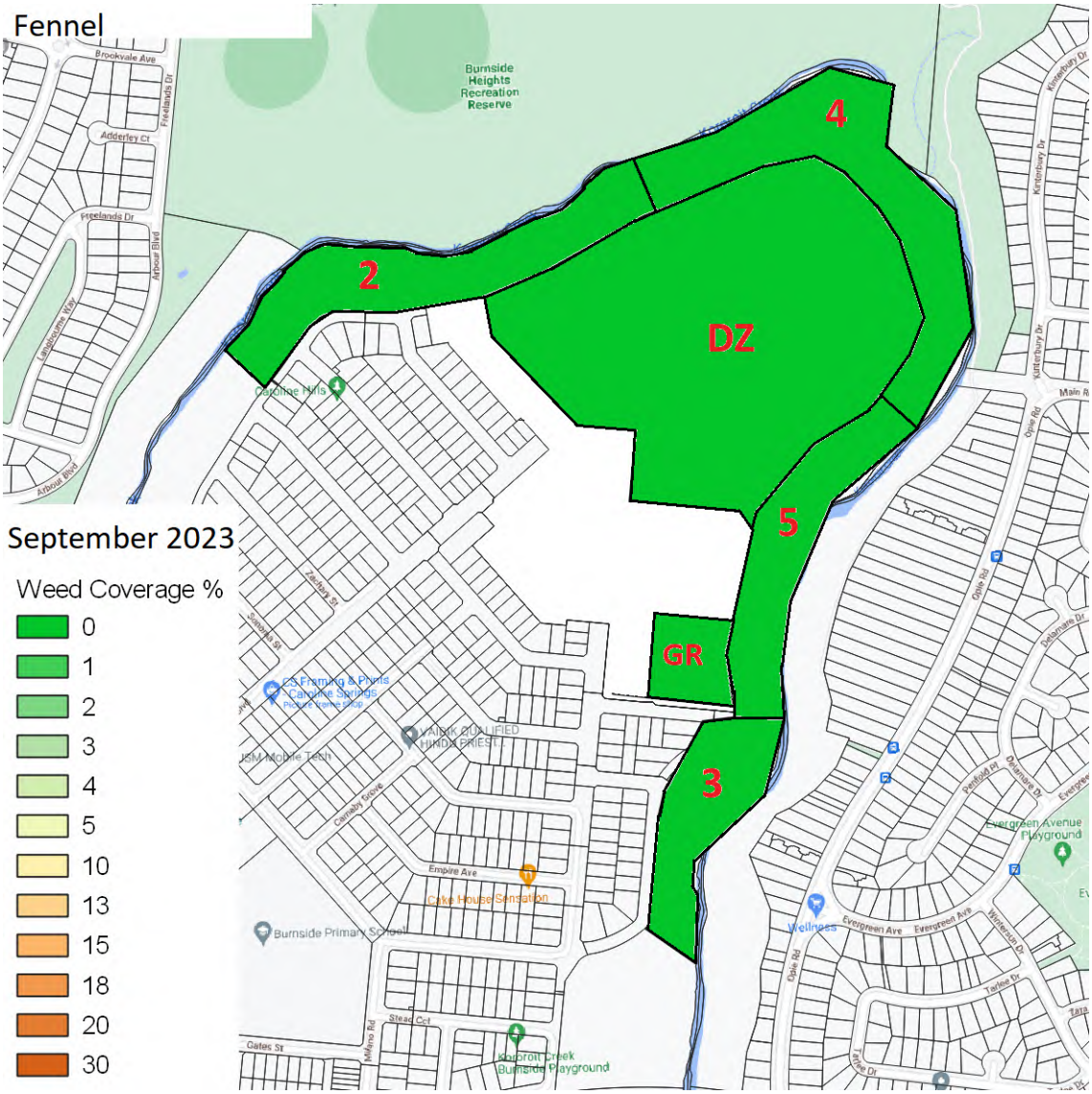
4.8 Fennel - Foeniculum vulgare

Restricted Weeds **noxious** **Target coverage < 1%**

Current Coverage

Mgt Zone	2	4	5	3	DZ
September 2023	**0%**	**0%**	**0%**	**0%**	**0%**
June 2023	0%	0%	0%	0%	0%
March 2023	0%	0%	0%	0%	0%
September 2022	0%	0%	0%	0%	0%
June 2022	0%	0%	0%	0%	0%
March 2022	0%	0%	0%	0%	0%
December 2021	0%	0%	0%	0%	0%
October 2021	0%	0%	0%	0%	0%
August	0%	0%	0%	0%	0%
Apr 2021	0%	0%	0%	0%	0%
Dec 2020	1%	0%	0%	1%	0%
Oct 2020	0%	0%	0%	0%	0%
June 2020	0%	0%	0%	0%	0%
April 2020	0%	0%	0%	0%	0%
Dec 2019	0%	1%	1%	1%	0%

An erect multi-stemmed perennial herb commonly 1.5 to 2.0 metres high. It is found along waterways, drainage lines and in seasonally moist locations within grasslands and woodlands. Dense infestations may restrict access to waterways. A soft, herbaceous plant the high growth of the plant may be a nuisance to people.


Fennel
Burnside Heights Recreation Reserve
4
2
DZ
5
GR
3
September 2023
Weed Coverage %
0
1
2
3
4
5
10
13
15
18
20
30
Burnside Primary School
Cake House Sensation
Wellness
Evergreen Avenue Playground
Burnside Playground

4.9 Galenia - Galenia pubescens

Not declared or considered noxious **Target coverage < 5%**

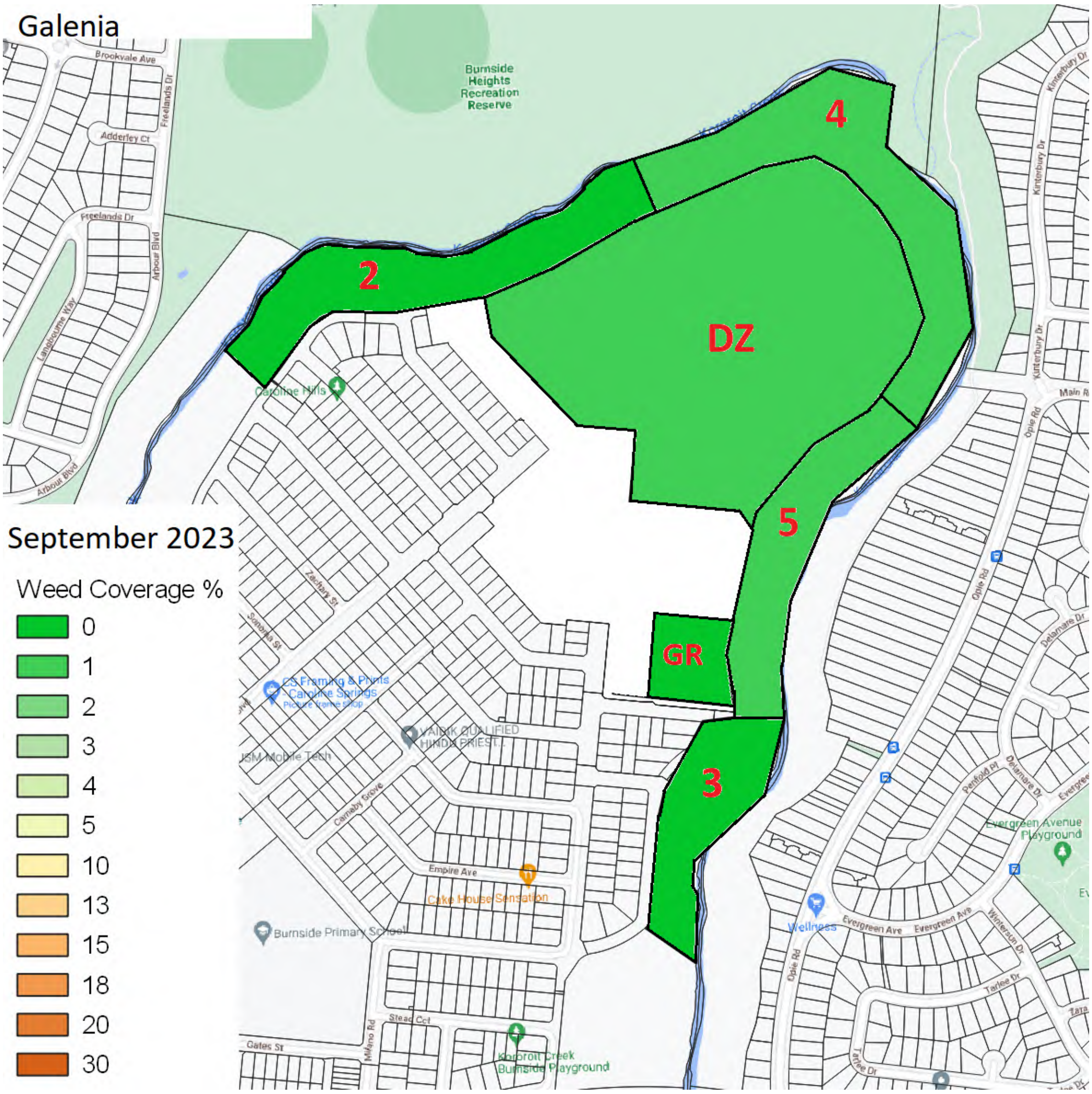
Current Coverage

Mgt Zone	2	4	5	3	DZ
September 2023	**0%**	**1%**	**1%**	**0%**	**1%**
June 2023	0%	1%	1%	0%	1%
March 2023	1%	0%	1%	0%	1%
September 2022	1%	0%	1%	0%	1%
June 2022	1%	0%	1%	0%	2%
March 2022	2%	0%	1%	1%	4%
December 2021	1%	1%	1%	1%	5%
October 2021	1%	1%	1%	1%	10%
August 2021	1%	1%	1%	1%	0%
Apr 2021	1%	1%	1%	1%	0%
Dec 2020	1%	1%	0%	1%	0%
Oct 2020	0%	0%	0%	1%	0%
June 2020	1%	0%	1%	0%	0%
April 2020	1%	0%	0%	1%	0%
Dec 2019	2%	1%	1%	1%	1%

This perennial creeping, herbaceous plant growing to about 60 cm high and 1–2 m wide.

It is deep rooted and flowers from late spring to early autumn. Galenia reproduces by seed. Most dispersal of seed occurs by wind, water, birds and livestock. Movement of contaminated soil by vehicles and equipment can also contribute to its spread.

Drought and salt tolerant, galenia grows over and smothers existing vegetation by forming a thick dense mat. It invades coastal dunes, pastures, disturbed areas, lawns, roadsides and rocky outcrop vegetation. Galenia is known to produce nitrates that can be toxic to stock.



Galenia
September 2023
Weed Coverage %
0
1
2
3
4
5
10
13
15
18
20
30
2
4
DZ
5
GR
3
Burnside Heights Recreation Reserve

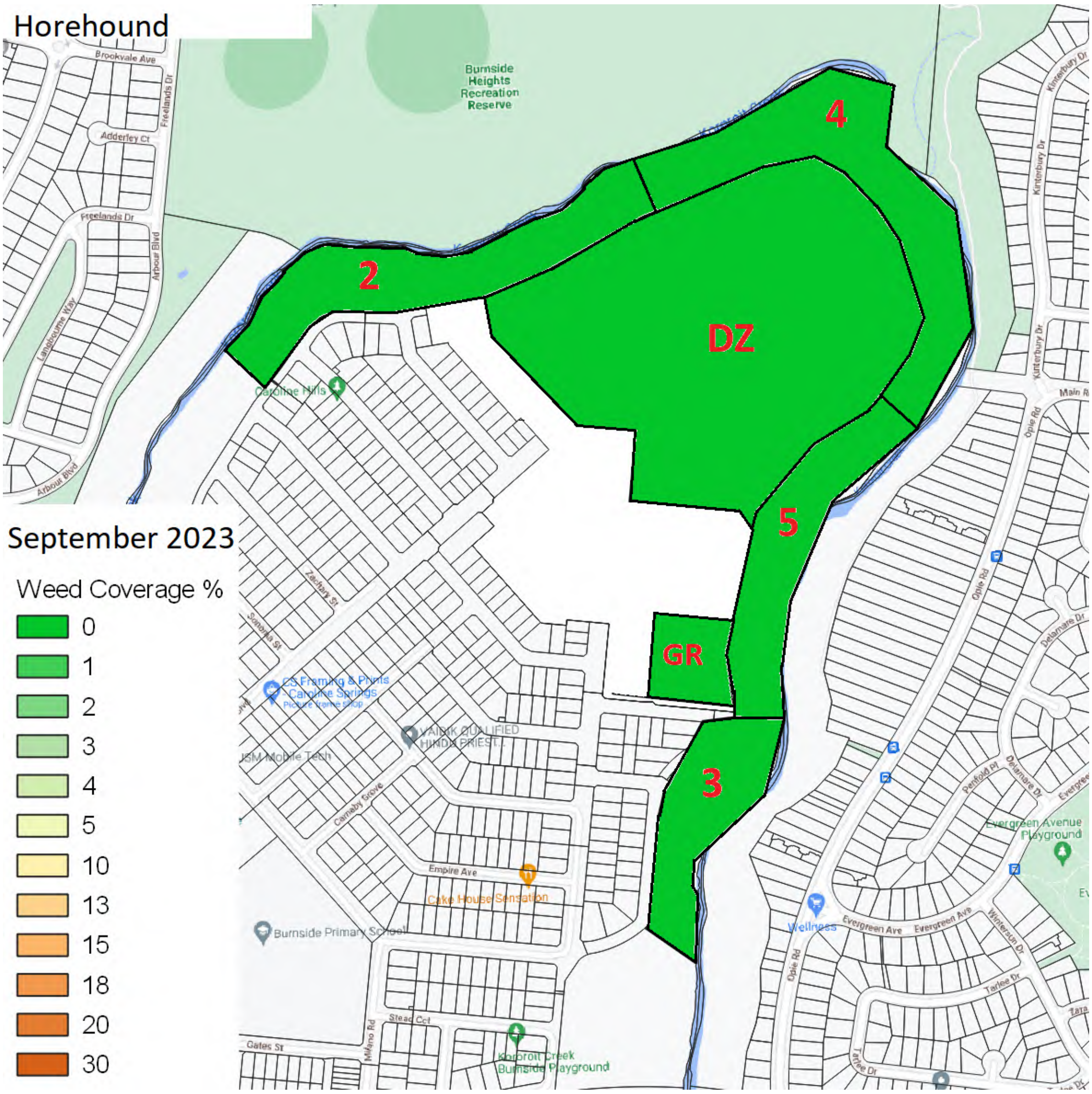
4.10 Horehound - Marrubim vulgare

Not declared or considered noxious **Target coverage <5%**

Current Coverage

Mgt Zone	2	4	5	3	DZ
September 2023	**0%**	**0%**	**0%**	**0%**	**0%**
June 2023	0%	0%	0%	0%	0%
March 2023	1%	0%	0%	0%	0%
September 2022	1%	0%	0%	0%	0%
June 2022	1%	0%	0%	0%	0%
March 2022	0%	1%	1%	0%	0%
December 2021	0%	0%	0%	0%	0%
October 2021	0%	1%	0%	4%	3%
August 2021	0%	1%	0%	1%	0%
Apr 2021	0%	1%	0%	1%	0%
Dec 2020	0%	1%	1%	1%	0%
Oct 2020	1%	0%	1%	0%	0%
June 2020	0%	1%	0%	1%	0%
April 2020	0%	1%	1%	0%	0%
Dec 2019	0%	0%	0%	0%	0%

A bushy perennial plant, 30 to 80 cm high, sharply aromatic when crushed, covered with dense whitish hairs. Horehound thrives on poor soil and in waste places. It invades poor pastures which provide little competition. Horehound contains a bitter alkaloid which makes it unpalatable for grazing livestock. As well as being an agricultural weed of pastures horehound has become an important environmental weed because of its ability to invade disturbed native vegetation.


Horehound
Burnside Heights Recreation Reserve
2
4
DZ
5
GR
3
September 2023
Weed Coverage %
0
1
2
3
4
5
10
13
15
18
20
30

4.11 Paterson's Curse - Echium plantagineum

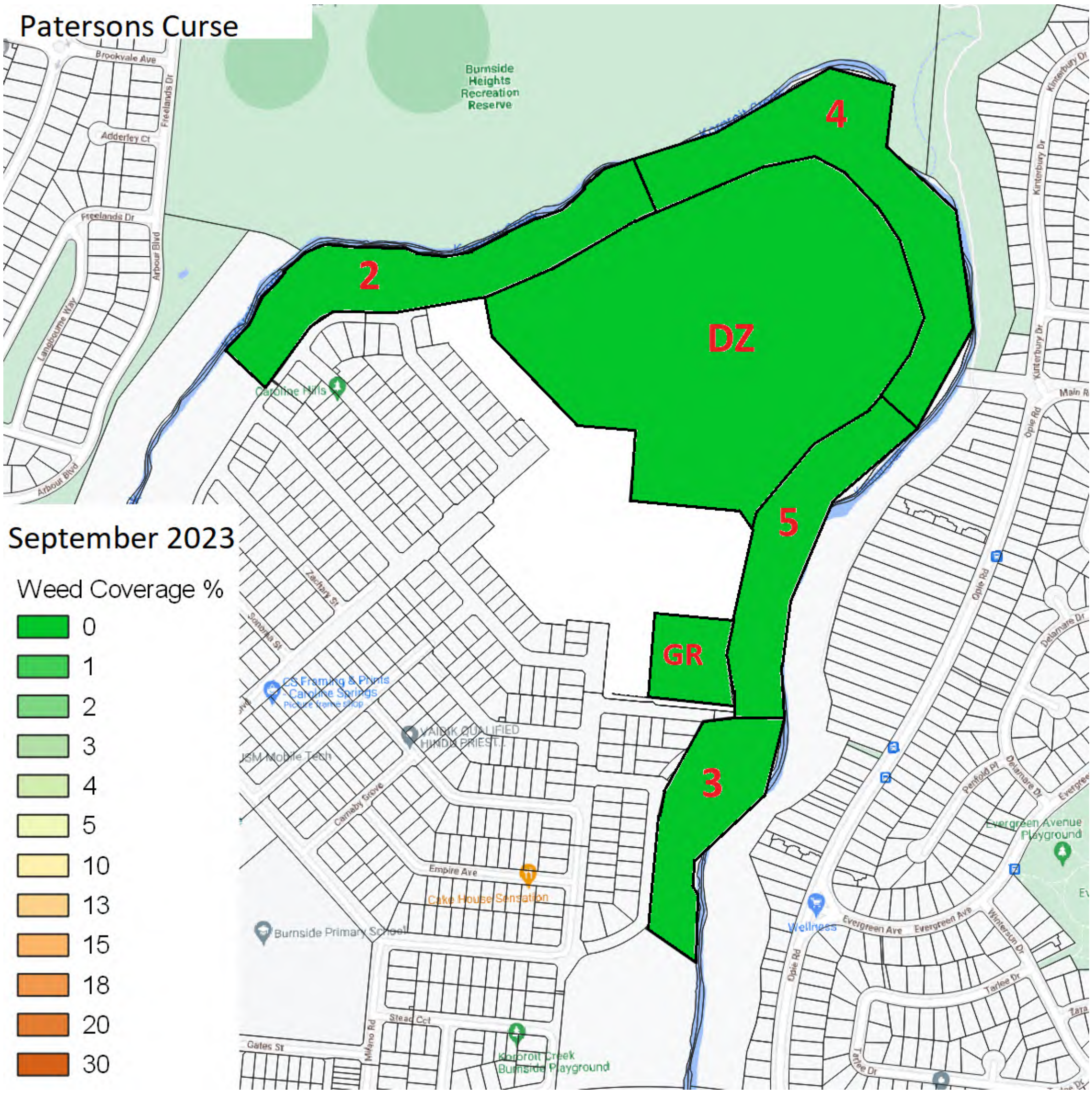
Regionally controlled **Target coverage < 5%**

Current Coverage

Mgt Zone	2	4	5	3	DZ
September 2023	**0%**	**0%**	**0%**	**0%**	**0%**
June 2023	0%	0%	0%	0%	0%
March 2023	0%	0%	0%	0%	0%
September 2022	0%	0%	0%	0%	0%
June 2022	0%	0%	0%	0%	0%
March 2022	2%	0%	0%	2%	2%
December 2021	0%	0%	0%	0%	0%
October 2021	0%	0%	0%	0%	10%
August 2021	0%	0%	0%	2%	10%
Apr 2021	0%	0%	0%	0%	0%
Dec 2020	1%	1%	1%	1%	2%
Oct 2020	2%	1%	1%	2%	2%
June 2020	2%	2%	5%	5%	5%
April 2020	5%	10%	5%	5%	10%
Dec 2019	5%	1%	2%	2%	2%

Paterson's curse is an annual, occasionally biennial, herb that grows as a rosette in autumn and winter and produces flowering stalks in spring and early summer. The rosette usually grows parallel to the ground; however, the leaves may be erect in dense vegetation.

Plants begin to produce flowering stalks in late winter, commence flowering in early spring and die in summer. The flowers are usually purple but may be blue or pink. The first mature seeds are produced four to six weeks after flowering commences.



Patersons Curse
September 2023
Weed Coverage %
0
1
2
3
4
5
10
13
15
18
20
30
2
4
DZ
5
GR
3
Burnside Heights Recreation Reserve

4.12 Prickly Pear - Opuntia spp.

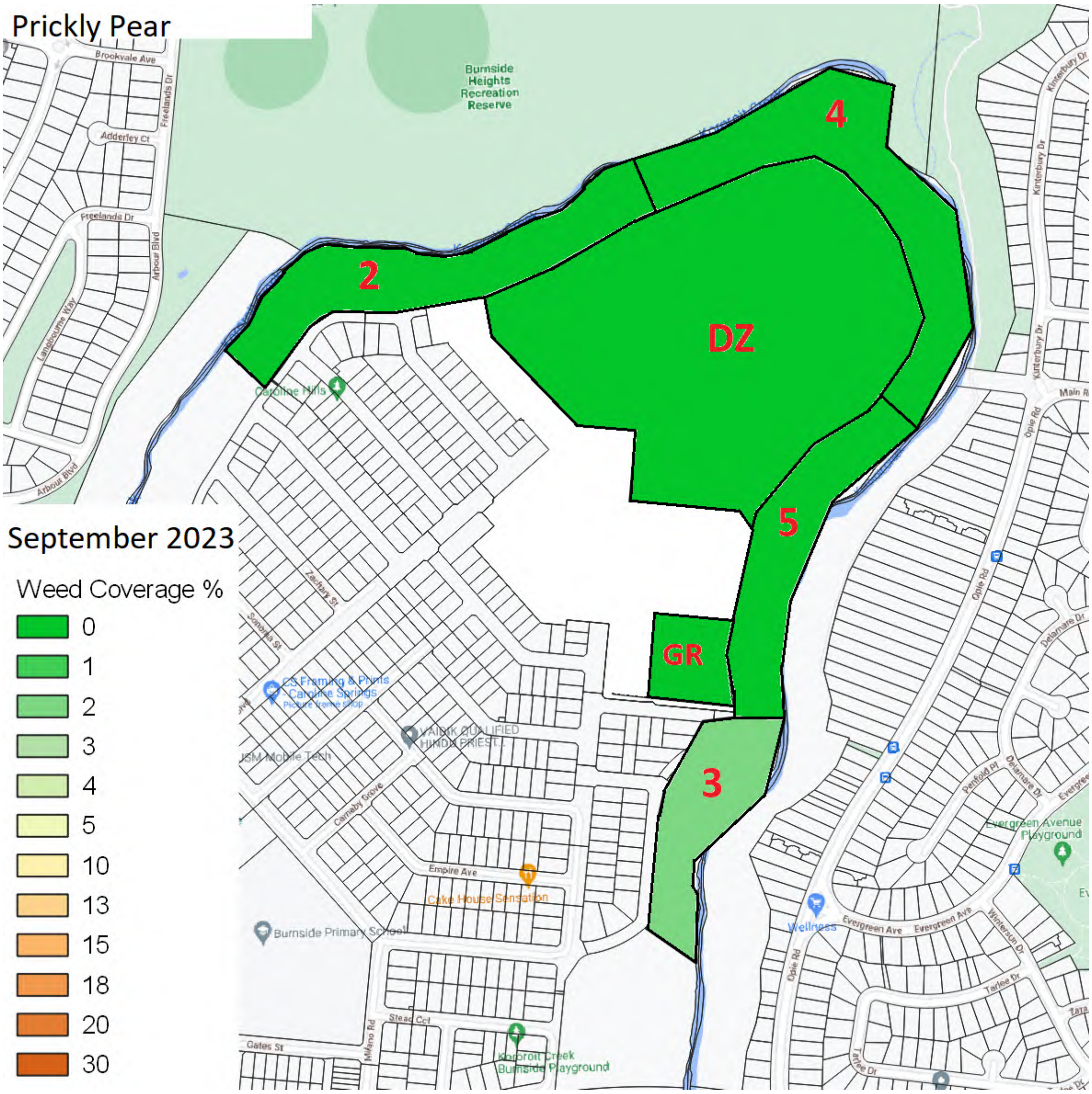
Regionally controlled **Target coverage <5%**

Current Coverage

Mgt Zone	2	4	5	3	DZ
September 2023	**0%**	**0%**	**0%**	**2%**	**0%**
June 2023	0%	1%	0%	2%	0%
March 2023	0%	0%	0%	2%	0%
September 2022	0%	0%	0%	1%	0%
June 2022	0%	0%	0%	1%	0%
March 2022	0%	0%	0%	0%	0%
December 2021	0%	0%	0%	0%	0%
October 2021	0%	0%	0%	1%	0%
August 2021	0%	1%	0%	1%	0%
Apr 2021	0%	1%	0%	1%	0%
Dec 2020	0%	1%	0%	1%	0%
Oct 2020	0%	1%	0%	1%	0%
June 2020	0%	1%	0%	0%	0%
April 2020	0%	1%	0%	1%	0%
Dec 2019	0%	1%	1%	1%	0%

Prickly pear is an erect succulent shrub which can grow to a height of 5 m. The stems of prickly pear are commonly grey green to light green. The plant usually has one main woody stem with dense prickles, which gives way to several side branches made up of fleshy segments. The segments are approximately 45 cm long, 15 cm wide and 1-2 cm thick, with the upper segments appearing to droop.

Each plant segment has areoles, which are growing points where new segments, flowers or roots can be produced. Each areole has short tuffs of finely barbed bristles and sometimes one to five sharp, 5 cm long spines. Spines are more common on segments that are older and lower on the plant.


Prickly Pear
Burnside Heights Recreation Reserve
2
4
DZ
5
GR
3
September 2023
Weed Coverage %
0
1
2
3
4
5
10
13
15
18
20
30

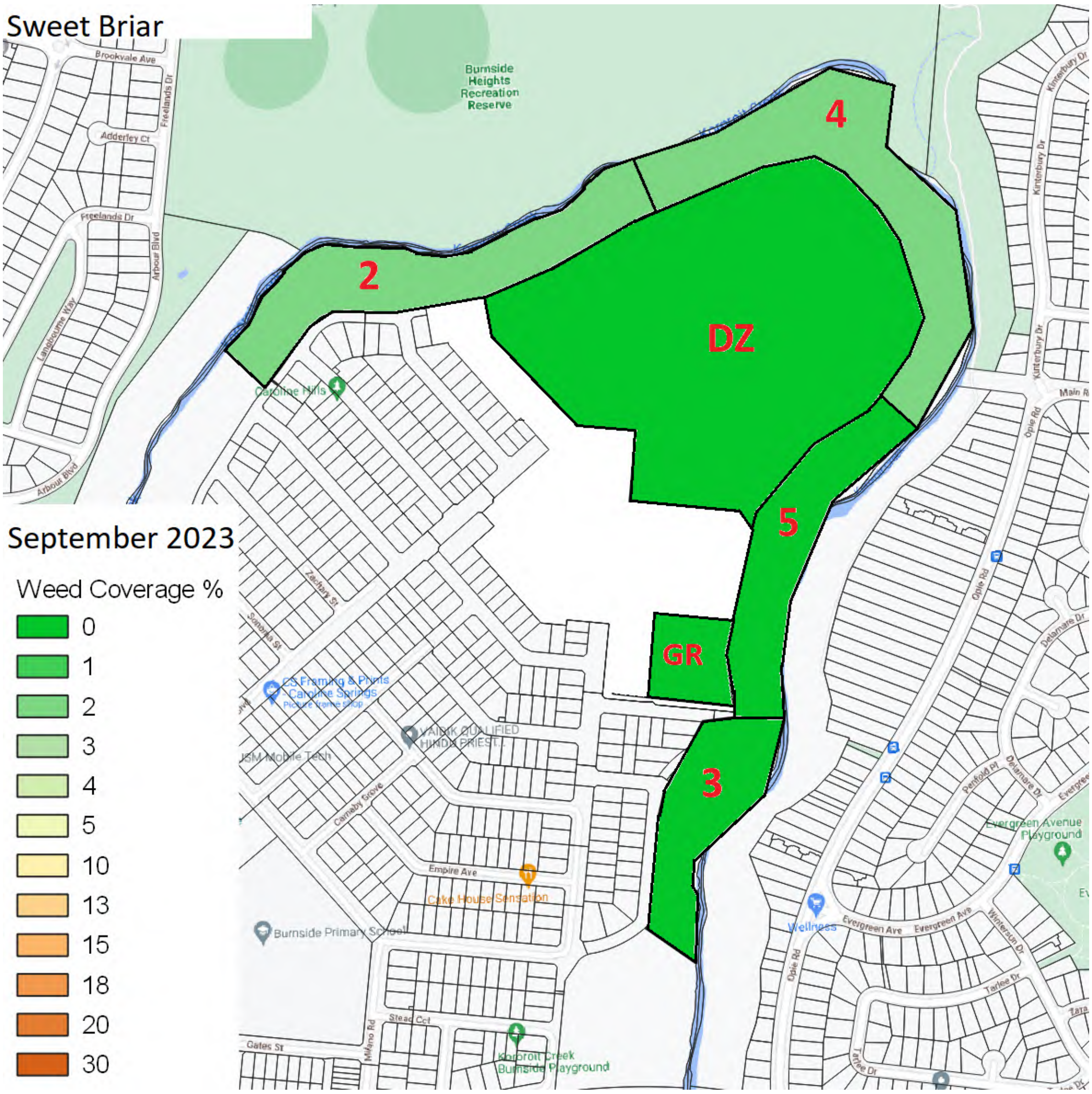
4.13 Sweet Briar - Rosa rubiginosa

Regionally Controlled **Target coverage <1%**

Current Coverage

Mgt Zone	2	4	5	3	DZ
September 2023	**2%**	**2%**	**0%**	**0%**	**0%**
June 2023	2%	1%	0%	0%	0%
March 2023	2%	2%	0%	0%	0%
September 2022	0%	0%	0%	0%	0%
June 2022	0%	0%	0%	0%	0%
March 2022	0%	2%	0%	0%	1%
December 2021	0%	0%	0%	0%	1%
October 2021	1%	1%	1%	1%	1%
August 2021	1%	1%	1%	1%	1%
Apr 2021	1%	1%	1%	1%	1%
Dec 2020	1%	1%	0%	0%	0%
Oct 2020	1%	1%	0%	0%	0%
June 2020	1%	1%	1%	0%	0%
April 2020	1%	1%	0%	1%	0%
Dec 2019	1%	1%	0%	1%	0%

Sweet briar is a perennial woody shrub up to 3m tall. The stem is usually many (and can be up to several hundred) stems arising from the rootstock; erect or scrambling, up to 3 metres high, green and smooth to brown and somewhat roughened, woody, branched, spreading and sometimes trailing, heavily covered with down-curved prickles up to 1.5 cm long.


Sweet Briar
September 2023
Weed Coverage %
0
1
2
3
4
5
10
13
15
18
20
30
4
2
DZ
5
GR
3
Burnside Heights Recreation Reserve
Brookvale Ave
Adderley Ct
Freelands Dr
Arbour Blvd
Caroline Hills
Empire Ave
Cake House Sensation
Burnside Primary School
Kororoit Creek Burnside Playground
Gates St
Evergreen Ave
Evergreen Avenue Playground
Opie Rd
Kinterbury Dr
Wellness

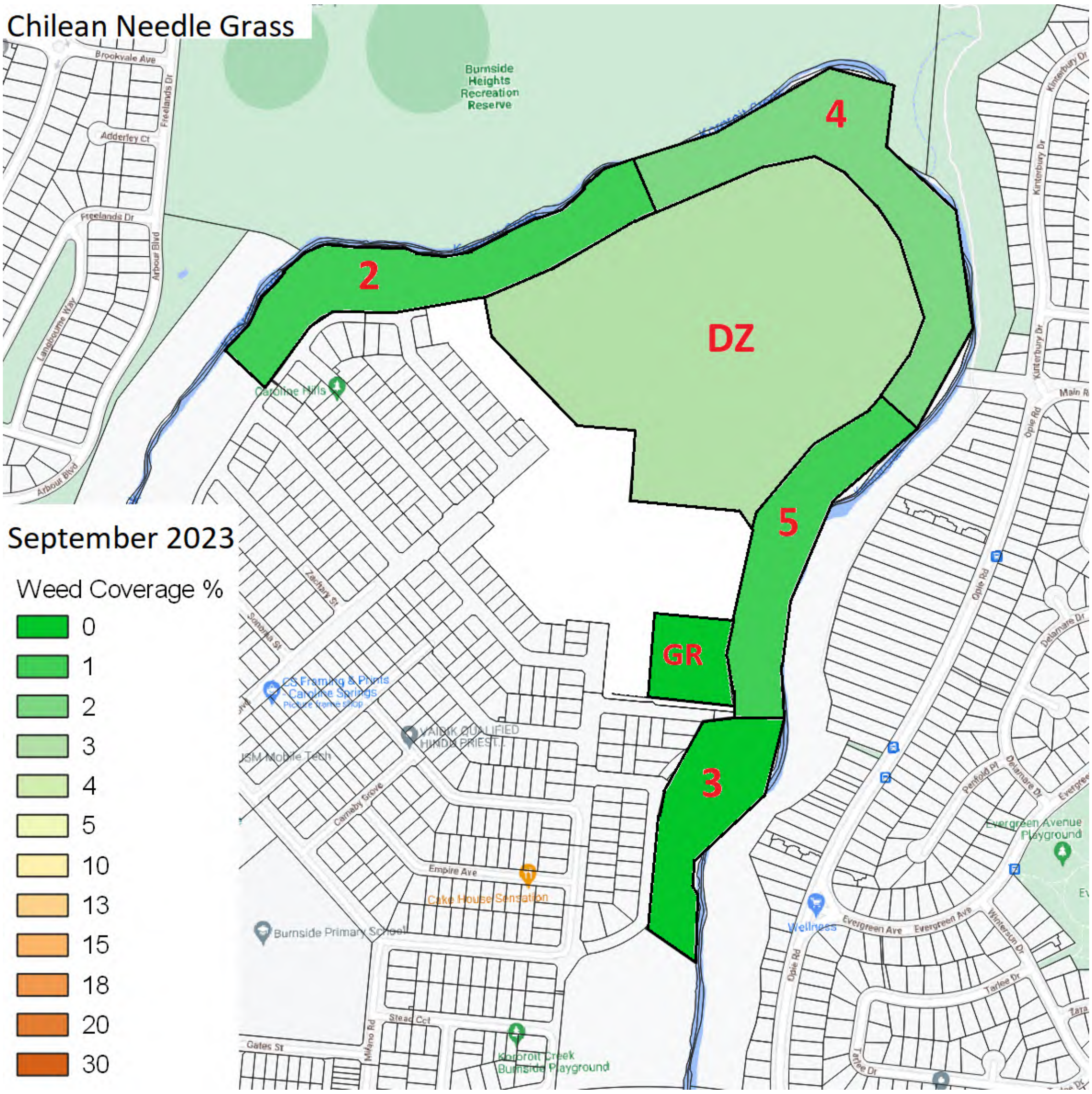
4. 14 Chilean Needle Grass - Nassella neesiana

Regional restricted **Target coverage < 5%**

Current Coverage

Mgt Zone	2	4	5	3	DZ
September 2023	**1%**	**2%**	**1%**	**0%**	**3%**
June 2023	2%	1%	1%	0%	4%
March 2023	2%	1%	1%	0%	4%
September 2022	2%	1%	0%	0%	4%
June 2022	2%	1%	0%	0%	5%
March 2022	5%	10%	5%	5%	15%
December 201	5%	5%	5%	5%	20%
October 2021	5%	3%	5%	5%	15%
August 2021	5%	3%	5%	5%	15%
Apr 2021	2%	2%	5%	5%	2%
Dec 2020	0%	0%	2%	2%	2%
Oct 2020	0%	0%	2%	5%	2%
June 2020	0%	0%	2%	1%	2%
April 2020	0%	0%	1%	5%	2%
Dec 2019	0%	0%	1%	5%	2%

Chilean needle grass is a tussocky perennial in the Spear grass group of grasses growing to about 1 m high. It leaves are hairless and are normally grow to 30 cm long and 5 mm wide. With the flowering head being to 40 cm long.


Chilean Needle Grass
September 2023
Weed Coverage %
0
1
2
3
4
5
10
13
15
18
20
30
2
4
DZ
5
GR
3
Burnside Heights Recreation Reserve

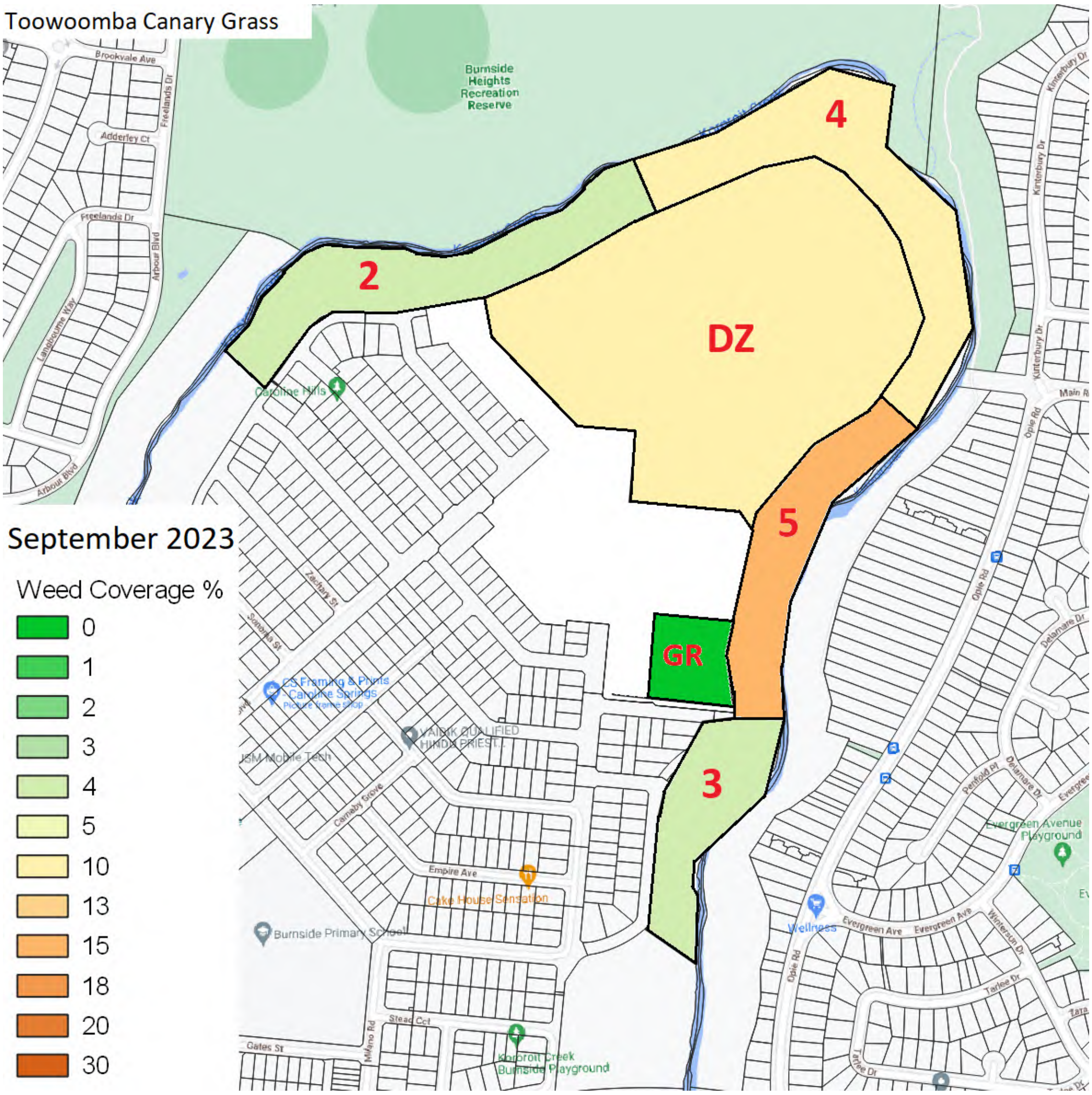
4.15 Toowoomba canary grass - Phalaris aqatica

Not declared and considered noxious **Target coverage < 5%**

Current Coverage

Mgt Zone	2	4	5	3	DZ
September 2023	**4%**	**10%**	**15%**	**4%**	**10%**
June 2023	5%	15%	25%	5%	10%
March 2023	5%	10%	20%	5%	10%
September 2022	10%	10%	15%	5%	10%
June 2022	10%	15%	20%	10%	15%
March 2022	20%	20%	20%	20%	20%
December 2021	25%	25%	20%	25%	30%
October 2021	15%	20%	20%	20%	4%
August 2021	13%	18%	20%	20%	4%
Apr 2021	5%	5%	5%	5%	2%
Dec 2020	2%	2%	2%	2%	0%
Oct 2020	5%	5%	5%	5%	0%
June 2020	2%	2%	2%	2%	0%
April 2020	2%	2%	2%	2%	0%
Dec 2019	1%	2%	5%	5%	5%

Widely used as a pasture species where annual rainfall exceeds 450 mm. It prefers fertile, seasonally moist sites. Commonly spreads from pastures, road verges and drainage ditches to adjacent indigenous vegetation. Toowoomba canary grass invades dry coastal vegetation, heathland and heathy woodland, lowland grassland and grassy woodland, dry sclerophyll forest and woodland, damp sclerophyll forest, riparian vegetation, and freshwater wetlands.


Toowoomba Canary Grass
September 2023
Weed Coverage %
0
1
2
3
4
5
10
13
15
18
20
30
2
4
DZ
5
GR
3
Burnside Heights Recreation Reserve

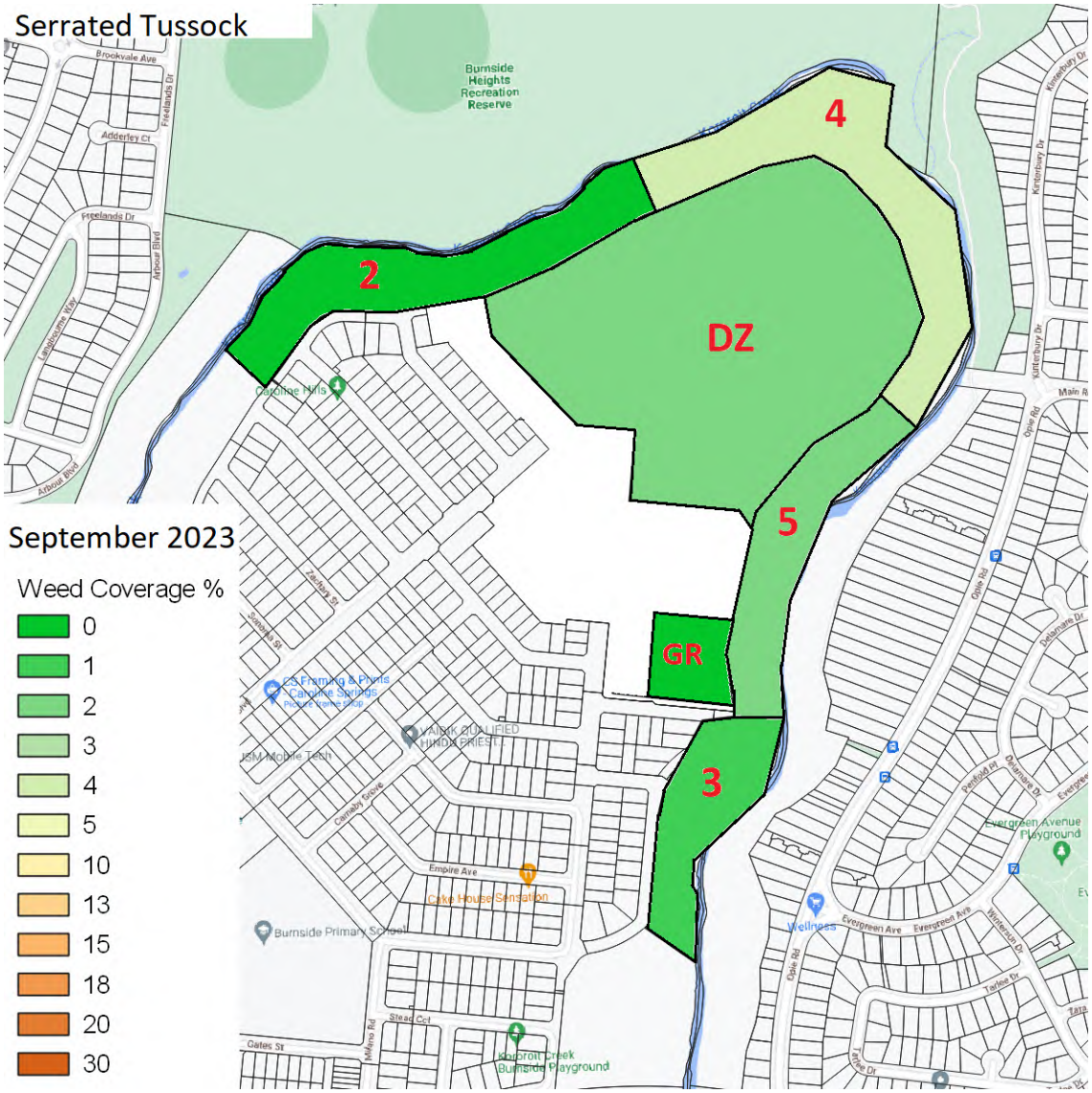
4.16 Serrated Tussock - Nassella trichotoma

Regionally Controlled - *Weed of National Significance* **Target coverage < 5%**

Current Coverage

Mgt Zone	2	4	5	3	DZ
September 2023	**0%**	**4%**	**2%**	**1%**	**2%**
June 2023	0%	3%	3%	2%	3%
March 2023	0%	3%	3%	1%	3%
September 2022	0%	1%	1%	1%	3%
June 2022	2%	5%	2%	2%	10%
March 2022	2%	10%	5%	5%	10%
December 2021	5%	10%	5%	5%	15%
October 2021	10%	15%	5%	10%	30%
August 2021	5%	15%	5%	10%	13%
Apr 2021	5%	5%	5%	5%	10%
Dec 2020	2%	2%	2%	2%	2%
Oct 2020	5%	5%	5%	2%	5%
June 2020	5%	5%	5%	2%	5%
April 2020	5%	5%	5%	2%	5%
Dec 2019	5%	5%	5%	5%	10%

Serrated tussock is a long-lived perennial grass growing up to 60cm in height with a base of 25cm in diameter. Plant size varies with soil fertility and location. In infertile conditions plants may only reach a height of 15cm. Serrated tussock is shallow rooted with an extensive network of fibrous roots occurring predominantly in the top 20cm of soil. The roots are dense, wiry, and fibrous making serrated tussock very difficult to pull out, even when small. Flowering stems emerge from the base of the plant. They are multi-branched and up to 35cm long. The purple colour of the small seeds produces an overall purplish haze to the serrated tussock seed head. Once the seeds have formed, the entire seed head will 'droop' over the tussock towards the ground. Flowering takes place as early as late winter (August) and will continue throughout the spring (September – November). Autumn flowering has been known to occur. Seeds take 8 – 10 weeks to mature, normally occurring throughout the spring and summer months. Once seeds are ripe, the whole flowing stem detaches from the base of the plant and is dispersed by the wind. Seed is dormant and will not germinate for about 6 months.

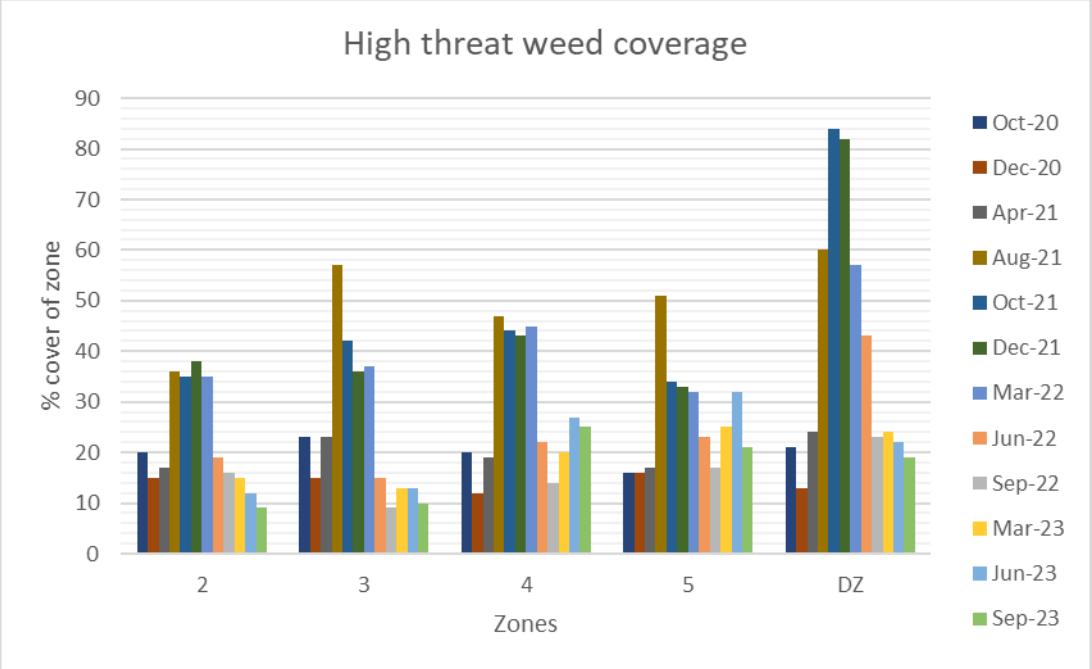

Serrated Tussock
September 2023
Weed Coverage %
0
1
2
3
4
5
10
13
15
18
20
30
Burnside Heights Recreation Reserve
4
2
DZ
5
GR
3
Caroline Hills
Burnside Primary School
Cake House Sensation
Evergreen Avenue Playground
Wellness
Kororoit Creek Burnside Playground

6.0 Summary

6.1 Overview

The below table displays the total percentage coverage in each zone of high-threat weeds. Since the previous report, there has been the slightest decrease in the overall coverage of high-threat weeds across all zones. During this visit, it was noted that *Phalaris aquatica* (Toowoomba Canary Grass) is still the most dominant species throughout most zones.

Approximately 65% of the development zone is now under construction and 50% of Zone 3 and Zone 2 have also been developed.



6.2 Zone 2

This zone has been developed by landscapers, resulting in a 50% reduction in size. The highly invasive large grass Phalaris aquatica is becoming less dominant in the area. The removal of this species is being carried out gradually, with a focus on the areas of higher vegetation value first. This will allow the newly opened areas to regenerate naturally without increasing the risk of erosion.

It is worth noting that all woody weeds have been eliminated, with only a limited number of small Rosa rubiginosa remaining on the site.

6.3 Zone 4

The highly invasive large grass Phalaris aquatica has been significantly reduced in this zone. However, future removal of the species needs to be done slowly and carefully, starting from areas with higher vegetation value and working outwards. This will allow for the natural regeneration of the newly opened areas without significantly increasing the chances of invasion by other unfavourable species such as one of the Nasella species present on site.

All woody weeds have been controlled, and only a limited number of specimens were found across the site. There is a small patch of Century Plant (Agave Americana) that is being slowly controlled.

6.4 Zone 5

The population of the highly invasive large grass species, Phalaris aquatica, has shown a slight decrease. Future removal of the species is recommended and that it be done slowly and carefully. The removal process should start from areas with higher vegetation value and gradually move outwards. This approach would allow for the natural regeneration of the newly opened areas, minimizing the chances of invasion by other unfavourable species. It is crucial to prevent the invasion of other species, such as one of the Nasella sp. present on site, as they can have negative impacts on the ecosystem.

On a positive note, all woody weeds have been successfully controlled across the site. No identified specimens were found during the survey, indicating that the control measures have been effective. This is an encouraging development, as woody weeds can have detrimental effects on the environment and native species.

6.5 Zone 3

Each quarter, the highly invasive large grass Phalaris aquatica is becoming less dominant. In the future, the removal of this species should be done gradually, starting from the areas of higher vegetation value and moving outward. This will allow for the natural regeneration of the newly opened areas without significantly increasing the chances of invasion by other unfavorable species, such as one of the Nasella species on site. Landscape works have been completed along the roadside of this zone, reducing the area by about 50%. There is one Prickly Pear (Opuntia spp.) located on the vertical ledge, which is gradually being reduced.

6.7 Development zone

This area varies significantly others previously dominated by Serrated Tussock, now having small patches *Phalaris aquatica*. Also, various patches of Artichoke Thistle (*Cynara cardunculus) are* starting to decline, through weed management controls and the shrinking of the DZ due to increased development. The development in this area is causing a loss of weed vegetation due to vehicle and plant movement.

7.0 Conclusion

The number of herbaceous high threat weeds, such as Spear Thistle, Fennel, Cape weed and Paterson's Curse, is low. However, Phalaris aquatica, while in a slow but steady decline, still dominates various zones. Phalaris aquatica plants along the creek line have not been treated during the last several visits. In areas where the Phalaris has been removed, it is being replaced by Nassella trichotoma, also known as Serrated Tussock.

Rather than using widespread herbicide treatment, future plans involve slashing regimes, interspersed with selective treatments for individuals, or small stands, near higher vegetation values. This approach will be incorporated into the future treatment regime. Due to the increase of Phalaris and Nassella in Zone 5 and 4, the focus should be on these species moving forward until their numbers are brought back to controllable levels.

The considerable number of Artichoke Thistles (Cynara cardunculus) in the Development zone has been reduced. However, further control is required to prevent them from spreading to other zones.

Appendix 6: Cressy offset site, Year 4 (2023) annual report

BushBlocks

Annual Management Report

(EPBC2011/6063)

Central Eastern Grassland

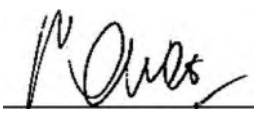
Long Paddock Offset Site

6165 Hamilton Highway, Cressy

Year 4: February 2022- February 2023

Contents

Landowner Reporting Form

Landowner of offset site	Deep Lead Property Pty Ltd
Location and address of offset site	6165 Hamilton Highway, Cressy, Vic
Offset site number (if applicable)	C2017_2(A)
Offset plan reference number	EPBC 2011/6063
Responsible Authority	Trust for Nature, DCCEEW (formerly DoEE), Dennis Family Corporation
Report #	Year 4
Signature	Paul Guest – Director- Deep Lead Property ltd 
Date	26/10/2023

1. INTRODUCTION

This document addresses the requirements for Offset management reporting, for offsets located at 6151 Hamilton Highway, Cressy. The broader 75ha site is the location of Offset areas for 5 separate Offset Agreements.

This report presents information relating to offset management for **Year 4** of a 10-year management plan for the relevant Offset Area - **Offset Management Zone 5 (OMZ-05)** named the **Central Eastern Grassland.** The following page presents a map of the site, highlighting the relevant offset areas to this reporting.

The offset was created as part of infrastructure works undertaken by **Dennis Family Corporation**, which resulted in impacts to matters of National Environmental Significance under the Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act) in relation to **EPBC referral 2011/6063,** including;

- Natural Temperate Grassland of the Victorian Volcanic Plains (NTGVVP) ecological community
- Spiney Rice-flower (SRF) *Pimelea spinescens* subs*. spinescens*

The date of legal execution for the Offset Agreement and commencement of the Offset Management Plan (OMP) (Brett Lane and Associates, 2018) for this area is **17th April 2019.**

Reporting requirements for this offset area i an **annual management report**, (this document), to be completed by **February** each year, and to contain details of management actions, including

- Details of management actions, including on groundwork, undertaken within the reporting period
- Results of monitoring activities, including fence condition, weeds, pest animals, and ground cover/biomass accumulation/cover of open ground
- Site photographs including from 5 defined monitoring points
- Details of compliance and non-compliance with the schedule of management actions

Table 1. Offset Areas located at the property of 6165 Hamilton Hwy, Cressy

	Zone Name	Offset Management Zone	Size	Date of Legal Execution
Tier 1	Northwest Grassland (NWG)	0MZ-01	5 ha	4th October 2018
Tier 2A	Central East Grassland (CEG)	0MZ -05	29.1 ha	17th April 2019
Tier 2B	Seasonal Herbaceous Wetland Two (SHW2)	0MZ -04	11.86 ha	17th April 2019
Tier 2C	Seasonal Herbaceous Wetland One (SHW1)	0MZ -03	2.52 ha	17th April 2019
Tier 3	Southwest Grassland (SWG)	0MZ -02	16 ha	26th Sept 2020
	Far East Grassland (FEG)	0MZ -06		

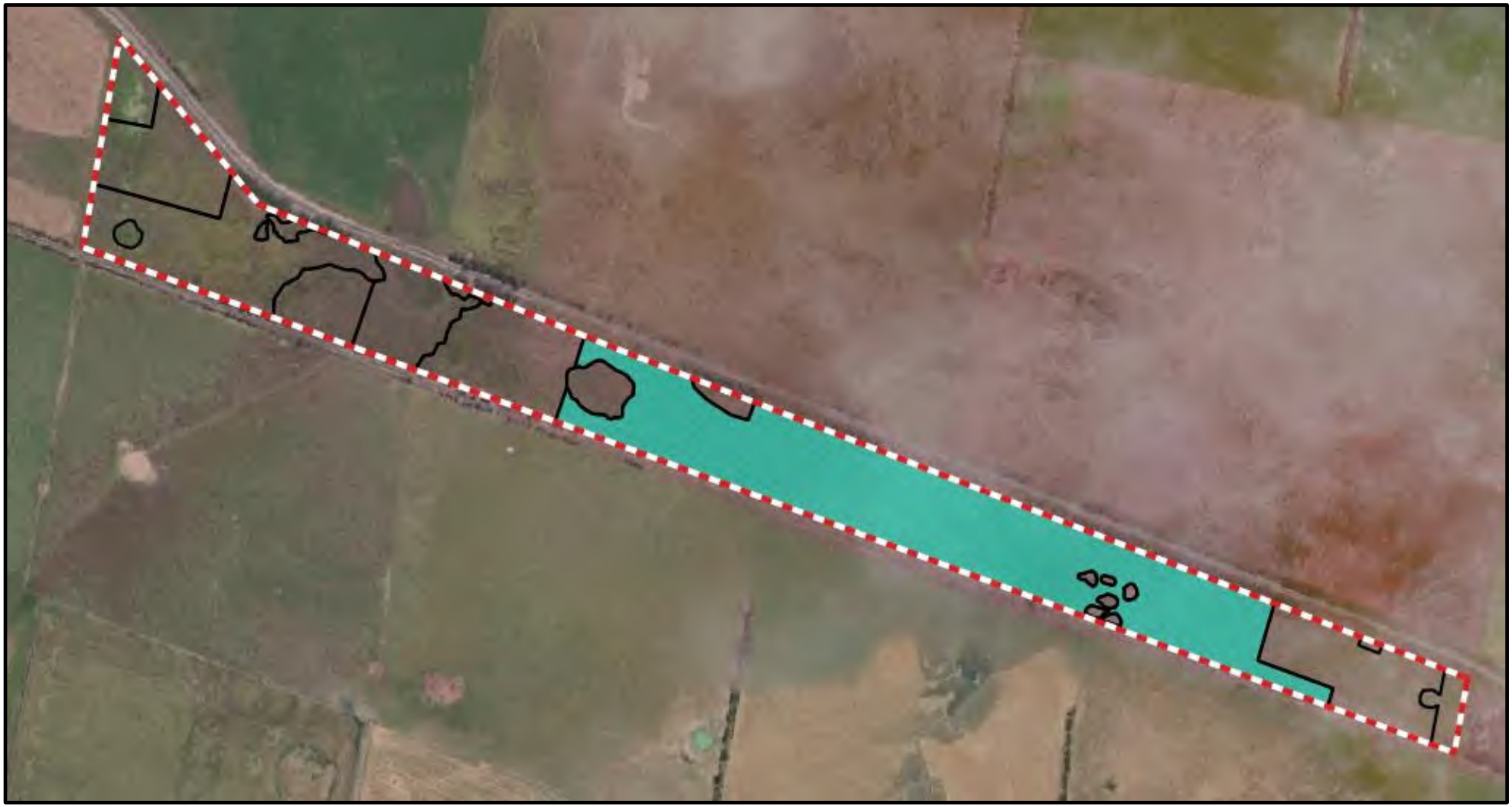


Figure 1. Management areas pursuant to Offset Agreement [EPBC 2011/6063]. Central Eastern Grassland (OMZ-05)

2. Completed Works

2.1 Record keeping

- The site logbook in an online record of times and dates that landowners, contractors, consultants, or other relevant parties have visited the site for the purposes of management or monitoring actions and plays an important role in recording works completed on the site
- The logbook is maintained by the landowners through regular correspondence with contractors to record important information relating to site management or monitoring.
- Typical entries include date, name of personnel on site, activities being completed, general observations of flora or fauna, weather, presence of standing water, comment on biomass etc.
- A summary of Property Logbook for Year 4 is provided in Appendix 1

2.1.1 Quarterly Site visits

The area is required to be visited at least quarterly by the landowner. The following activities are undertaken at each quarterly visit;

- walk of boundary fencing to assess any signs of damage or unauthorised entry of people or stock
- general observations. This includes locations and notes as appropriate in relation to;
    - woody or herbaceous weed infestations- species and location
    - estimates of percentage cover of inter-tussock space
    - signs of pest animals, or other tracks scats, or signs of predation
    - signs of erosion, pugging, damage to vegetation
- Detailed observations from quarterly site visits are available on request

2.2 Fence Condition

2.2.1 Offset demarcation

- The numerous Management Zones within the site are not individually fenced. The intersections of the OMZs with boundary fencing have been marked with short (approx. 30 cm high) star pickets for identification.
- Yellow safety caps identify the boundaries visually; tags are also attached to indicate the offset area.

2.2.2 Additional Internal Fencing

- Installation of additional internal fencing for rotational grazing has now been installed to create smaller paddocks/cells.
- The property has been sectioned into 4 large grazing cells, and a smaller domestic zone.
    - **Cell 1**- Domestic Zone (non-covenanted area)
    - **Cell 2**– Features generally higher biomass, higher weed-cover.
    - **Cell 3**- Includes small portion of OMZ-05 (higher quality), and seasonal herbaceous wetland areas with stricter grazing restrictions.
    - **Cell 4**- Includes portion of OMZ-05, includes larger, high quality grassland area, moderate biomass, lower weed-cover.
    - **Cell 5**- Includes portion of OMZ-05, features generally higher biomass, higher weed-cover.

2.2.3 Bore Installation

- Bore and water point installation in Cell 1 was completed in March 2023, servicing Cells 1 and 2.
- No additional water points have been installed within Cell 3. Grazing within this zone requires access to cells 1 and 2. Grazing progress utilising the new cells will be reviewed in Spring 2024 to determine if an additional water point is required in Cell 3.

2.3 Weed Monitoring and Control

2.3.1 Site Walkover – Spring 2022

- Weed monitoring is conducted annually in Spring and involves inspection of the entire offset area for woody weeds, by foot.
- All infestations or individual woody weeds are identified to species level and mapped with a GPS. Locations of woody weeds are then supplied to the weed management contractor/landholder for treatment.
- Subsequent monitoring revisits previously mapped infestations to evaluate the success of weed control, as well as inspecting the entire offset site for new infestations.
- During the survey, information on herbaceous weed species is also recorded, including the mapping of species and areas suitable for targeted treatment.

Results – OMZ-05

The Site walkover was conducted over two days on 30th November and 1st December 2022, and was completed by Bush Blocks Project Manager Emma Wilkin, on behalf of the landowner.

Collected data are provided to site contractors and incorporated into an annual works plan for Year 4. GIS mapping data from site walkover is available on request.

Woody Weeds – **no woody weeds are present within Offset Area.** African boxthorn removed from boundary fence line (Hamilton Hwy Road reserve)

Grassy and Herbaceous Weeds –

Annual Grasses

- **Large Quaking Grass** *Briza maxima* is ubiquitous across the property, co-occurring with kangaroo grass at time of assessment at varying cover up to 30%
- **Brome** *Bromus sp.* occurs <10% cover across both in OMZ-05, generally affects western portion of the property.
- **Oat** *Avena* occurs in small discreate patches <5% cover.
- **Squirrel-tail fescue** *Vulpia bromoides* generally outcompeted by dense Kangaroo Grass, 10-15% cover.

Perennial Grasses

- **Toowoomba Canary-grass** *Phalaris* in in dense stands in wetter area, no common, approx. 10%
- **Cocksfoot** *Dactylis glomerata* occurs mainly adjacent to boundary fencing and sporadically throughout property, 5% cover.

Herbaceous weeds

- **Flat Weed** *Hypochaeris radicata*, noticeable increase in cover from last year
- **White Clover** *Trifolium repens* small dense patches
- **Spear Thistle** *Cirsium vulgar,* occur sporadically throughout, and occasionally in denser patches

Completed Weed Control

Table 2. Weed Control Year 4, OMZ-5

Date	Weed Targeted	Method	Contractor
06/02/2023	Thistles African Boxthorn	Spot Spray Cut/Paint	Bush Blocks

2.4 Pest Animals

- There were no recorded sightings of pest animals within the Offset Area in Year 4 management period.
- Individual hares are sometimes sighted in the area but are not found to be creating disturbance on site. There were no signs of active or inactive rabbit warrens, or areas that could be seen as intensely browsed by rabbits or hares. There are also no areas of rubbish, or surface harbour within the site.
- No foxes have been observed within the property boundary. Foxes continue to be observed within the neighbouring area, and occasionally as roadkill on the Hamilton Highway within 10k of the property.
- There has been no evidence of any other pest animal species occurring on site.

2.5 Photo points

- Photo points are located at the boundaries and at the junction of offset management areas
- Photo point monitoring is conducted in Spring each year
- Results of Year 4 Photo points monitoring are provided in Appendix 4

2.6 Grazing and Biomass

2.6.1 Grazing progress monitoring

- Site is checked regularly at times where stock is present on site. Notes are taken regarding general site condition, grazing progress, signs of trampling, selective or overgrazing, pugging etc.
- Photos are also used as documentation of site condition during time of grazing, though the key measure of grazing success is through of review of biomass monitoring results from across the extent of the offset property.
- Photos and notes of grazing progress throughout Year 4 can be provided on request

2.6.2 Annual Biomass monitoring – Spring 2022

- This methodology is additional to that outlined in the OMP. This survey utilises a total of 100 (2x2 meter) quadrats that are placed at 50m intervals along entire length the 75ha property. A total of 47 biomass monitoring quadrats are located within or on the boundaries of the Offset Area.
- Objective is to gain a clear picture of how the wider offset site is changing and if management goals are fulfilling their objectives.
- There are two systems in place to measure biomass at each quadrat, the use of both giving more depth to the data collected

Indicator species (Lunt 2003)

The presence of these species is used to determine that native and exotic grasses have not out-competed native herbs. The three species chosen species all occur within the offset sites, these are

- Lemon Beauty-head *Calocephalus citreus,*
- Common Everlasting *Chrysocephalum apiculatum,* and
- Scaly Buttons *Leptorynchos squamatus,*

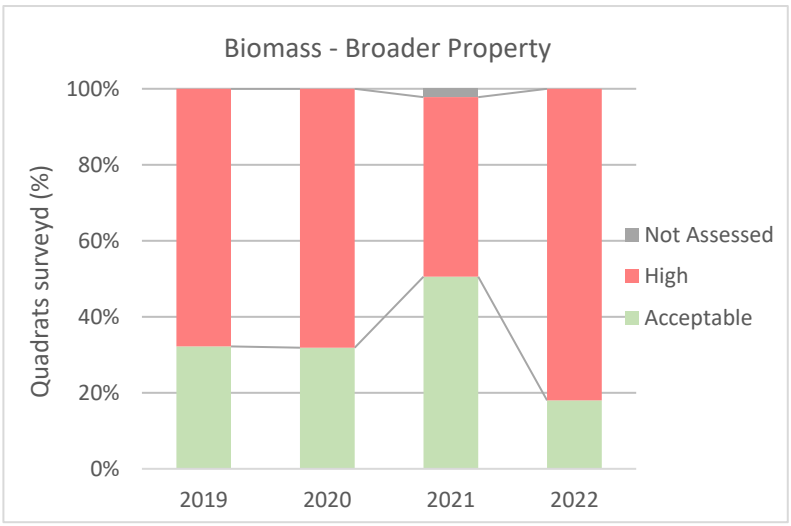
Inter-tussock space

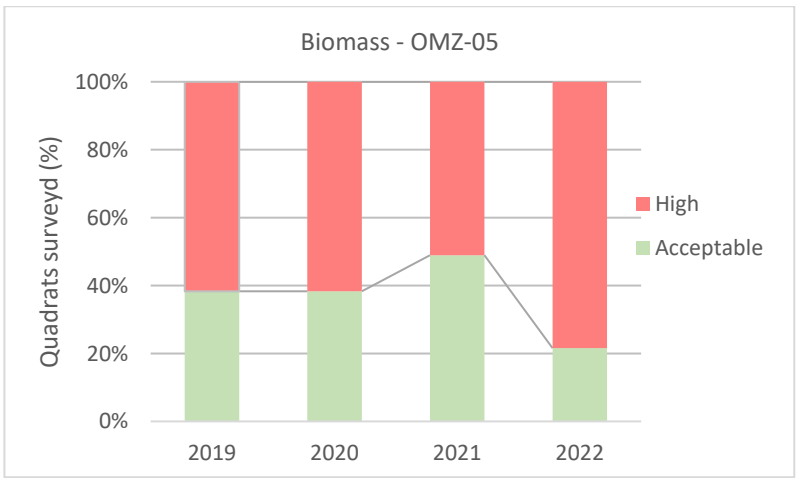
- The percentage of bare ground present is separated into five categories: 1-20%, 20-40%, 40-60%, 60-80%, and 80-100%.
- The objective range that must be maintained across the grassland over time is 20-40% bare ground with closer to 40% being the desirable goal. If the amount of bare ground reaches 50% pulse grazing should halt.
- This measurement of bare ground provides a clearer assessment of what areas should be targeted for biomass reduction and when mapped can show areas where controlled burns are a higher priority.

Results

- **Biomass is considered acceptable if indicator species are present, and/or percentage or bare ground is at least 20-40%**
- Assessment was conducted on 30th November and 1st December 2022 by Emma Wilkin
- Results show an overall increase in biomass levels compared to previous years
- Biomass levels in this zone are largely due to density of kangaroo grass *Themeda*, rather than of exotic annual pasture grasses
- Offset Area (OMZ-05) result are consistent with the average for the site, with approx. 20% of the area considered to have adequate inter-tussock space

These results are used to inform the proposed grazing strategy for the property. Note that the increase in biomass prompted adjustment to the grazing strategy, including additional grazing into the exclusion period as adaptive management.





Figures 1 and Figure 2: Presenting comparison of biomass monitoring results for OMZ-05, across monitoring years and against the conditions of the broader offset site

3. Future Works and Adaptive Management

3.1 Biomass reduction

3.1.1 Current challenges

- The wider 75ha property (single paddock) which contains the Offset Area is subject to 5 separate offset agreements/management plans, each written to address the specific conditions of each area.
- La Nina Climate conditions in 2022/2023 and in the years previous have resulted in an increase of biomass and exotic vegetation, with both seeing an increase in cover of both native and exotic vegetation.
- Biomass and vegetation monitoring have identified high levels of biomass, and reduction in suitable condition for improvement of grassland characteristics, including the opportunity for regeneration of native herbs through availability of inter-tussock space.
- Adaptive management actions were sought to extend the grazing period in 2022. Along with the utilisation of cell grazing, biomass appears to now be reduced at the time of writing this report. Results of Biomass and Vegetation Monitoring in 2023 will determine the success of the adaptive management and guide approach to future grazing/burning regimes for priority areas.

3.2 Annual Works Plan

A detailed annual works plan for the entire site will be provided to Trust for Nature in January of each year, in response to review of results of all management and monitoring actions.

A preliminary summary of Annual Works relating to the Offsets Area for Year 5 is as follows:

- Review effectiveness of adaptive management – grazing
- Reduce occurrence of Phalaris within management zone (achievable considering species tends to be located discreet patches
- Consider ecological burn to reduce biomass associated with kangaroo grass.

Appendix 1. Property Logbook Summary

Start ↑	End	Title	Type of visit	Company	Zone
01/02/2022	01/02/2022	**Site Meeting**	site meeting	Bush Blocks / Grazier	
11/02/2022	11/02/2022	**Site Meeting**	site meeting	Bush Blocks / Tree Management Services	
18/02/2022	18/02/2022	**Fencing**	contracting	Tree Management Services	OMZ 05, OMZ 06
21/02/2022	22/02/2022	**Fencing**	contracting	Tree Management Services	OMZ 05, OMZ 06
12/03/2022	13/04/2022	**Grazing - Sheep On (798)**	management	Bush Blocks / Grazier	Cell 5
13/03/2022	13/03/2022	**Quarterly Site Visit**	monitoring	Bush Blocks	
22/03/2022	23/03/2022	**SLL Tiles In**	management	Bush Blocks	
13/04/2022	04/05/2022	**Grazing - Rotation (798)**	management	Bush Blocks	Cells 1, 2, 3, 4
15/04/2022	15/04/2022	**Site Visit - grazing progress check**	general site visit	Bush Blocks	East end, west end
27/04/2022	28/04/2022	**Fencing**	contracting	Tree Management Services	
04/05/2022	06/05/2022	**Fencing**	contracting	Tree Management Services	
05/05/2022	05/05/2022	**Site Visit**	management	Bush Blocks	All
21/05/2022	08/08/2022	**Grazing - Sheep on (400)**	management	Grazier	C1, C2, C3. C4
24/05/2022	24/05/2022	**Grazing - Sheep Off (798)**	management	Bush Blocks / Grazier	
16/07/2022	16/07/2022	**Site Visit - grazing progress check**	general site visit	Bush Blocks	OMZ 06
01/08/2022	01/08/2022	**SLL Tiles out**	monitoring	Bush Blocks	OMZ 01, OMZ 02. OMZ 06
08/08/2022	31/08/2022	**Grazing - Rotation (400)**	management	Grazier	C5
09/08/2022	09/08/2022	**Site Meeting**	site meeting	Bush Blocks / DELWP	
31/08/2022	04/10/2022	**Grazing - Rotation (400)**	management	Grazier	C4
26/09/2022	26/09/2022	**SLL 1/6**	monitoring	EcoAerial Environmental Consulting	OMZ 01, OMZ 02. OMZ 06
04/10/2022	16/11/2022	**Grazing - Rotation (400)**	management	Grazier	C1, C2
12/10/2022	12/10/2022	**Vegetation Monitoring**	monitoring	Ecocentric Environmental Consulting	OMZ 01, OMZ 02. OMZ 06
18/10/2022	18/10/2022	**Weed Control**	management	Bush Blocks	OMZ 01, OMZ 02
19/10/2022	19/10/2022	**SLL 2/6**	monitoring	EcoAerial Environmental Consulting	OMZ 01, OMZ 02. OMZ 06
01/11/2022	01/11/2022	**Site Visit**	monitoring	Bush Blocks	OMZ 04, OMZ 05, OMZ 06
03/11/2022	03/11/2022	**SLL 3/6**	monitoring	EcoAerial Environmental Consulting	OMZ 01, OMZ 02. OMZ 06
07/11/2022	07/11/2022	**Weed Control**	management	Bush Blocks	OMZ 06
16/11/2022	27/12/2022	**Grazing - Rotation (400)**	management	Grazier	C3, C2, C1
18/11/2022	18/11/2022	**SLL 4/6**	monitoring	EcoAerial Environmental Consulting	OMZ 01, OMZ 02. OMZ 06
20/11/2022	20/11/2022	**Site Visit**	monitoring	Bush Blocks	Road Boundary
30/11/2022	30/11/2022	**Biomass/Weed Monitoring**	monitoring	Bush Blocks	All Zones
30/11/2022	30/11/2022	**Boundary Photopoints and QSV**	monitoring	Bush Blocks	All Zones
30/11/2022	30/11/2022	**SLL 5/6**	monitoring	EcoAerial Environmental Consulting	OMZ 1, OMZ 2. OMZ 6
08/12/2022	08/12/2022	**SLL 6/6**	monitoring	EcoAerial Environmental Consulting	OMZ 1, OMZ 2. OMZ 6
27/12/2022	31/01/2023	**Grazing - Rotation (400)**	management	Grazier	C4
30/12/2022	30/12/2022	**Slashing- Bore preparation**	management	Bush Blocks	Domestic Zone
03/01/2023	03/01/2023	**Bore Drilling**	contracting	Hutchisons Drilling	Domestic Zone
06/01/2023	06/01/2023	**GSM check**	monitoring	Bush Blocks	OMZ 1, OMZ 2. OMZ 6
13/01/2023	13/01/2023	**GSM check**	monitoring	Bush Blocks	OMZ 1, OMZ 2. OMZ 6
31/01/2023	11/03/2023	**Grazing - Rotation (400)**	management	Grazier	C1. C2
06/02/2023	06/02/2023	**Weed Control**	management	Bush Blocks	OMZ 05, OMZ 06

Appendix 2. Summary of required management actions – Year 4

Management Actions Years 2-9	Timing	Target to be achieved	Actions completed	Month completed	Comments
Landowner to Liaise with TfN and develop annual works plan	Within 3 months of (Feb) each year	Annual Works Plan is prepared	**Y-**	Feb	Annual works plan discussed with TfN (Karen Tymmes) on 1st Feb 2023. Agreed approach moving forward is for an Annual Work Plans for the broader 75 Ha site to be provided at the beginning of each calendar Year (Jan)
Monitor weeds and implement control if required: - Ecological grazing to reduce biomass of introduced species and prevent seed set - Herbicide and/or flame weeding use as required	March to May or September to November As required as per optimal time for each species (herbicide and/or flame weeding	See section 3.4.2, Table 5.	Y	General observations recorded throughout Year Weed monitoring conducted in Spring	Monitoring conducted and information provided to nominated contractor
Map rabbit warrens using a GPS until and implement control Monitor fox populations and implement control if required	Autumn (or at commencement)	Pest animals controlled	Y	Ongoing	Site visits and monitoring found no signed of established pest animals – pest animal controlled deemed unnecessary
Biomass reduction through ecological burning or ecological grazing if required	February – May (Burning) End of January to end of September (grazing)	Grassy Biomass layer reduced Inter-tussock spaces maintained to optimise ecological function	Y	Ongoing	Additional fences installed to allow for rotational grazing as per management plan, and to address problem areas of the site
Weed and Biomass monitoring	September to November	Results will inform management approaches and techniques	Y	Nov 2021	Sprog monitoring detected higher levels of biomass in previous years
Site quality audit (qualified ecologist engaged by the land owner)	Late Spring to early Summer Years 1, 4, 7, 10	Results will inform management approaches and techniques	N		Ecologist has been engaged to complete audit in Spring 2023 (Year 5)
Monitoring to determine fencing integrity and timeliness of management actions	Boundary fencing formally inspected every three months each management action monitored	Boundary fencing effective and management actions undertaken on time	Y	Fencing monitored at quarterly site inspections	Fences adequate, Rock wall stabliised through additional wire fencing (Feb 2022) Grazing checks completed regularly when sheep are on site
Report to be prepared documenting management actions undertaken and monitoring results	No later than three months after the anniversary of commencement (ie July)	Report delivered to DFC, TfN and DoEE no later than three months after the anniversary of commencement	N	October	Agreed submission date is Feb each year Report not submitted by due date
(TfN) -Monitoring of the offset site to determine whether the prescribed management actions are resulting in the desired outcomes outlined in this plan	Three times over the life of the (OMP)	Feedback delivered to Landowner and DFC	Y	Ongoing	

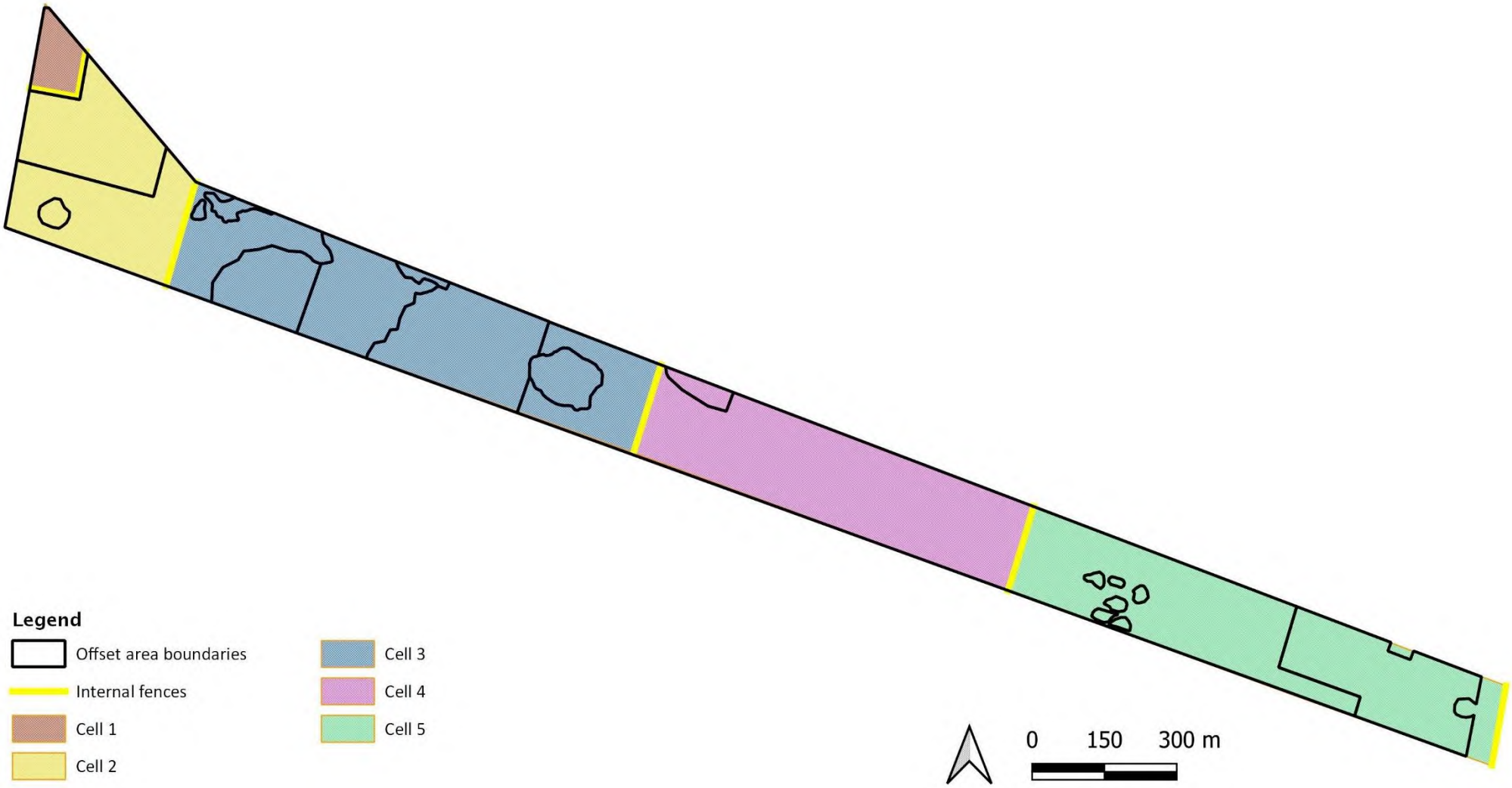
Appendix 3. Maps

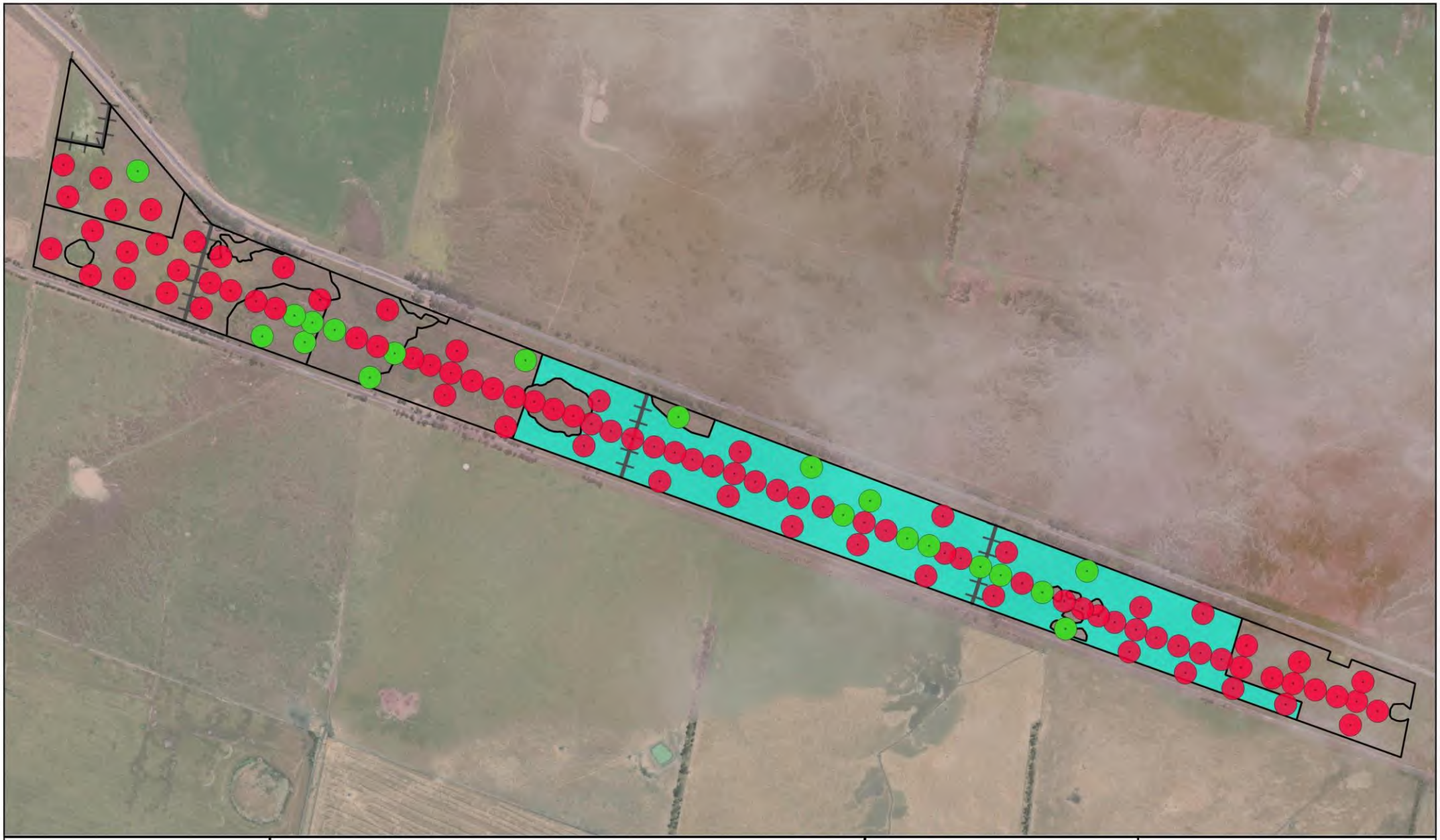
Map 1- New Grazing Paddocks

Map 2- Biomass Monitoring 2022

Map 3- Photopoint Monitoring Locations

Map 1 - New Grazing Cells





Biomass Monitoring Spring 2022

Long Paddock Offset Site
6165 Hamilton Hwy, Cressy

Legend

Biomass_2022_data

- high biomass
- acceptable biomass

- Offset Management Zones
- Internal Fences (Feb 2023)
- Offset Area - EPBC2011/6063

Details

Date: 20 July 2023
Version: 1
Created by: Emma Wilkin

Data Source:
Aerial Photography from Esri Satellite

BushBlocks

0 175 350 m

Photopoint Monitoring

Long Paddock Offset Site
6165 Hamilton Hwy, Cressy

Legend

- Property Boundary
- Offset Management Areas
- A Offset_edge
- OMZ-05

Details

Date: 30 August 2022
Version: 1
Created by: Emma Wilkin

Data Source:
Aerial Photography from Esri Satellite

BushBlocks

0 150 300 m

Appendix 4. Photo Points - Spring 2022

OE1 – W

OE2 – E

OE3–S

OE3 – W

OE4–E

OE19 – E

OE20 – W

OE21 – E

OE22 – W

Appendix 7: Karabeal offset site, Year 6 (2023) annual report

Marshall G. Dennis

From: Marshall G. Dennis
Sent: Monday, 5 June 2023 3:43 PM
To: nativevegetation.offsetmanagement@delwp.vic.gov.au
Subject: BB 3004 LAO 1 - Campbelltown - M.G. Pastoral Co. Pty. Ltd.
Attachments: 20230605_153545.pdf

-----Original Message-----
From: glenferrie@denniscorp.com.au <glenferrie@denniscorp.com.au>
Sent: Monday, June 5, 2023 3:36 PM
To: Marshall G. Dennis <Marshall.dennis@ranfurlieam.com.au>
Subject: Scanned image from Sharp MFD

Reply to: glenferrie@denniscorp.com.au <glenferrie@denniscorp.com.au> Device Name: Dennis Family Corp Device
Model: MX-5071
Location: 2-6 Glenferrie Rd, Malvern

File Format: PDF (Medium)
Resolution: 200dpi x 200dpi

Attached file is scanned image in PDF format.
Use Acrobat(R)Reader(R) or Adobe(R)Reader(R) of Adobe Systems Incorporated to view the document.
Adobe(R)Reader(R) can be downloaded from the following URL:
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http://www.adobe.com/

Department of Environment Land, Water & Planning Annual Report Form

Enter management year here: Year ____6_____

Enter Landowner name(s) here: M. G. Pastoral Co. Pty. Ltd._____

Management Agreement: BB-_3005__ LA0_1___

Site Code: Sites 1 & 2

Site-Zone	Standard to be achieved	Management action description	Timing	Action Completed (Yes/No)	Description of Actions and observed outcomes (Include or attach evidence of actions completed / comments / observed outcomes)
Sites 1 & 2	Maintain all boundary fencing in good stockproof condition	Regular visual inspections throughout the year of the boundary fences to maintain good stockproof condition	Ongoing	Yes	Contractor and Land Owner regularly inspected the boundary fences. Minor repairs were undertaken on some older sections of the boundary fence along RW McIntyres Rd. to keep Mr. McIntyres sheep from entering the sites whilst he undertook grazing of the roadway. This is done yearly to maintain the road as a 'fire break'. The repairs were completed using small sections of sheep mesh and plain wire.
Site 1	Erect a stockproof fence around the 'non-BB offset' site approx.. 50 m's from the top of the creek bank, for approx.. 750 m's as depicted on the approved BB site plan.	A fence consisting of star pickets, 5 x plain wires and 'ring lock' sheep meshing, approx.. 750 m's in length is to constructed in accordance with the dimensions and bearings depicted on the approved BB Site plan – site 1.	Year 1 & 2	Yes	GPS'd (surveyed) and pegged was completed in year 1. Fence was erected in totality in year 2. Nth./Sth. section running upto McIntyres Crossing Rd. was dismantled and re-built on GPS marks in Feb. '22.
Sites 1 & 2	Woody Weeds to be eliminated.	Cut and paint adult plants and spot-spray seedlings with approved herbicides, and monitor for new emerging weeds	Ongoing, Autumn & spring	Yes	Both African Box Thorn and Blue Gum seedlings were encountered after visual inspection during weed spot spraying. Both these weed species were cut & painted with approved herbicides.
Sites 1 & 2	Control of herbaceous weeds to a lesser level than when the BB agreement was executed.	Monitor and control new and emerging herbaceous weeds in both sites and treat weeds before the plant has flowered and set seed.	Autumn & Spring (early Summer).	Yes, but requires ongoing attention and action	All herbaceous weed spraying has been undertaken 'on foot' with no vehicles entering ay of the site, as directed. *Phalaris acquatica*, was primarily targeted this year, given the noticeable population of same, and the species propensity to shed seed a establish. *Phalaris arundinacaea,* was also treated, as was Yorkshire Fog, *Holcus lanatus*. Scotch and Spear thistles were also sprayed along both side sof the creek in areas 1I,1Q and 2F.

Site-Zone	Standard to be achieved	Management action description	Timing	Action Completed (Yes/No)	Description of Actions and observed outcomes (Include or attach evidence of actions completed / comments / observed outcomes)
Sites 1 & 2	Pest animals (rabbits & foxes) to be monitored and controlled.	Regular visual inspections across the entirety of the sites for evidence of pest animal presence; control and eradication where required.	Ongoing.	Yes.	Contractor and Land Owner regularly visually inspected both sites throughout the year. No evidence of rabbit or fox infestation were obvious; no noticeable traces of faeces or harbours were found. Although indigenous and not a pest, on one occasion there was a mob of grey kangaroos amongst the Plains Grassy Woodland area of1M, and the stand of Sugar Gums on the (middle) south boundary of Site 2.
Sites 1 & 2	Biomass management for high rainfall plains grassland.	All areas except 1M, to be burnt in a mosaic pattern, with one third to one fifth of the sites to be burnt annually, in accordance with BB Info. sheet # 14.	Autumn.	Yes.	A biomass burn was undertaken on the south western quadrant of site 1, encompassing area 1J, 1E, 1I,& 1Q. in Aug. '22. A good burn was achieved across these areas .
Sites 1 & 2	General	Noticeable soil disturbance, in various sections of the the overall property.	Ongoing	TBC	There is continuing disturbance of the top soil in sections of both sites by a ground based rodent, believed to be either the native bush rat – *Rattus fuscipes* or swamp rat – *Rattus lutreolus.* It would appear that whichever rodent is present it appears to be eating the corms/bulbs of onion grass which is present and of benefit in the control of this., Should the soil disturbance be deemed an issue then positive identification and control measures for same my be required.
Sites 1 & 2	General	Following discussion with the Dept.in June '22, the LO engaged Nature Advisory to undertake a field inspection & provide a 'review/status' report of both sites. The report (finally received in early March '23) was quite extensive and provided direction and advice for future actions.	Ongoing	TBC	The advice and suggested actions are being considered and actioned in conjunction to the OMP for the sitesand continue to be 'works in progress'. The NA report is appended to this ann. report.

Site-Zone	Management Action	Management action description	Timing	Completed (Yes/No)	Include or attach supporting evidence of actions completed / comments / observations
	Annual reporting				
All	Annual report is signed, dated and submitted by the landowner at least 1 month before the anniversary date of the agreement The annual report is a useful opportunity to make comprehensive comments and observations, giving a picture of the current condition of the site(s), issues identified, works undertaken and actions still required. You are encouraged to create a separate report to include in your annual reporting each year that captures this detailed information. The benefits of monitoring your vegetation condition and identifying issues and management undertaken, is that it aids you to gauge the success of management on the condition of native vegetation over time. The Department is also able to use this information to assist with the assessment of your compliance with the agreement and provides us with useful information and data for future management advice. Obligations of the landowner (compliance with section 6 of the Landowner Agreement) have been met, and I have read, signed, dated and submitted the obligations form with the annual report.	Prepare and submit an annual report providing evidence of works carried out. Where the actions were not carried out provided evidence as to the reason why. Include supporting evidence by: - detailed written observations & additional report - photo point monitoring - map of zones & photo points - photographs of works undertaken - receipts/invoices for materials & works carried out, including by contractors - log books of works carried out - obligations of the landowner form - payment method is correct - Receipts of seeds / seedlings ordered or purchased including a table/list of the species, numbers of each species (can estimate if using seeds), provenance - Site log - table/list of numbers of species planted/recruiting or germinated, including: numbers of each species by life form that are present/survived and/or were replaced for that year	Submit at least 1 month prior to agreement anniversary date		obligations of the landowner form where applicable: payment method is correct detailed written observations & additional report photo point monitoring map of zones & photo points photographs of works undertaken receipts/invoices for works carried out, including by contractors log books of works carried out Receipts seeds/seedlings, provenance, table of species list & numbers Site log / table of plantings/germination & survival numbers by life form

I hereby declare that the supplied information is accurate and complies with reporting requirements under General Conditions under the Second Schedule of the DELWP Management Agreement.

Signed: .....

Date: 29 / 5 / 2023

Small Farm Contracting

Karabeal Weed-Spraying Report, January 2023.

Small Farm Contracting commenced the annual weed-spraying program at 'Karabeal' in January, 2023.
After a very wet Winter season followed by an equally wet Spring, the additional growth, more than usual, of all pastures and weeds on the property was most significant.

Weed Treatment Techniques:

As directed work had to be spot spraying on foot-vehicles not permitted to be used in the weed spraying program.

As directed, ***Small Farm Contracting*** had previously allowed grazing on the north-western corner paddock near Karabeal Fire Station (not part of the Bush Broker sites) prior to this spraying program which greatly reduced the summer fire risk from the north-western area.

All Bush broker sites had tremendous growth and height in all pastures. (Refer photographs).

All spraying at 'Karabeal' had to be undertaken by a large ***Small Farm Contracting*** team extremely cautiously -in consideration of many risks including all fire risks on a number of hot days -spraying was accordingly not on consecutive days-staggered.
There was additional serious risk of snake bites due to the metre-high pasture and caution had to be taken.
The wet ground and bush rat holes the ground was very uneven and with incredibly high grass walking with back-packs was additionally difficult and time-consuming.

Despite the unusually difficult conditions and the requirement for slow spot-spraying on foot the entire property was effectively treated for all weeds.

Weeds:

The Phalaris grasses, Canary grasses and other prohibited weeds were spot-sprayed.
Site 1: There were small areas of Pharlaris grasses and the Wallaby grasses were extremely dense. (see photos).
Site 2: Large areas of Palaris and Canary Weeds treated but next year, after this 2023 SFC treatment, will be much-reduced.
Site 3: Quite a large number of extremely dense patches of Phalaris found.
Site 4: Large areas on the western end of Phalaris grasses with other isolated patches -these should be greatly reduced in area and number at the end of 2023.
Site 5: Patches of Phalaris weeds found however on the western side many Thistles had to be treated. Both these weed species had to be treated along the Creek edge.
Over the entire property Boxthorn and Blue gum regeneration seedlings had to be treated in addition.

Destructive animals:

There was no evidence of rabbits on the property, however kangaroos had been residing along the creek and amongst the coppice of regenerated Red Gums and amongst the block of Sugar Gums in the centre of Site 2.

Looking Forward:
There have been 2 years of intense targeting of very thick areas of Phalaris and Canary Grasses and looking forward to 2024 the Phalaris Grass and Canary Grass infestations should be greatly reduced and only found in small isolated patches.

Please note: The private property on the eastern side of the property, has been sold by Mr. Peter McIntyre, with whom ***SFC*** have collaborated (due to illness).

Always committed to best practice and optimal outcomes, Small Farm worked tirelessly on the important and significant project of crucial weed elimination and fauna tracking on 'Karabeal'.

Kind regards,
Graham Hewitt
Manager

Small Farm Contracting

One of the best investments you can make in your property

www.smallfarmcontracting.com.au
mobile: 0417044464 telephone: (03) 5250 1693

Destructive animals:

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G. R. Hewitt trading as

Small Farm Contracting Pty Ltd

A.B.N.: 30 608 262 942

POSTAL ADDRESS:
P.O. BOX 61, LEOPOLD 3224

TRADING ADDRESS:
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Ph: (03) 5250 1693
Mob: 0417 044 464
Fax: (03) 5250 2743

Online:
www.smallfarmcontracting.com.au
Email: grahamrhewitt@gmail.com

Tax Invoice

Bill To:

MG Pastoral Co.Pty Ltd DFC#041
Level 4,
863 High Street
Armadale Vic 3143

Invoice #: 00002798
Date: 16/05/2022

COMMERCIAL OPERATORS REGISTERED LICENCE NO. 126

DATE	DESCRIPTION	AMOUNT	CODE
11/05/2022	Company Code: DFC#041 Small Farm Contracting team intensive program of Cold Burn at Bush Broker Karabeal site. Registration of cold burn with Vic Fire. Slow burn at boundaries to secure boundary. Site 5 Cold Burn. Upon completion, extinguishing of all fires and securing of area. Always committed to best practice and optimal outcomes, Small Farm Contracting was committed to your important and significant Cold Burn project. Kind regards, Graham Hewitt Manager	$6,446.00	GST

Payment by Cheque to Postal Address or Electronic Funds Transfer (EFT)
*****PLEASE NOTE: NEW BANK DETAILS BELOW*****

EFT DETAILS:
Account Name: Small Farm Contracting
Bank: Bendigo Bank
BSB: 633-108
ACCOUNT NUMBER 1559 - 95590

GST:	$586.00
Total Inc GST:	$6,446.00
Amount Applied:	$0.00
Balance Due:	$6,446.00

G. R. Hewitt trading as

Small Farm Contracting Pty Ltd

A.B.N.: 30 608 262 942

POSTAL ADDRESS:
P.O. BOX 61, LEOPOLD 3224

TRADING ADDRESS:
30 Como Road, LEOPOLD 3224

Ph: (03) 5250 1693
Mob: 0417 044 464
Fax: (03) 5250 2743

Online:
www.smallfarmcontracting.com.au
Email: grahamrhewitt@gmail.com

Tax Invoice

Bill To:

MG Pastoral Co.Pty Ltd DFC#041
Level 4,
863 High Street
Armadale Vic 3143

Invoice #: 00002803
Date: 19/06/2022

COMMERCIAL OPERATORS REGISTERED LICENCE NO. 126

DATE	DESCRIPTION	AMOUNT	CODE
24/05/2022	MG Pastoral Co.Pty Ltd DFC#041 Completion of burning program at Karabeal, services supplied by the Small Farm Contracting team. The program consisted of spraying of the north end above creek of Site 5- triangular paddock Registration of fire burn with Vic.Fire, burn and extinguishing of fire when burn complete. Always committed to best practice and optimal outcomes, Small Farm Contracting worked tirelessly on your significant project of weed control with this cold burn.	$3,971.00	GST

Payment by Cheque to Postal Address or Electronic Funds Transfer (EFT)
*****PLEASE NOTE: NEW BANK DETAILS BELOW*****

EFT DETAILS:
Account Name: Small Farm Contracting
Bank: Bendigo Bank
BSB: 633-108
ACCOUNT NUMBER 1559 - 95590

GST:	$361.00
Total Inc GST:	$3,971.00
Amount Applied:	$0.00
Balance Due:	$3,971.00

G. R. Hewitt trading as

Small Farm Contracting Pty Ltd

A.B.N.: 30 608 262 942

POSTAL ADDRESS:
P.O. BOX 61, LEOPOLD 3224

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30 Como Road, LEOPOLD 3224

Ph: (03) 5250 1693
Mob: 0417 044 464
Fax: (03) 5250 2743

Online:
www.smallfarmcontracting.com.au
Email: grahamrhewitt@gmail.com

Tax Invoice

Bill To:

MG Pastoral Co.Pty Ltd DFC#041
Level 4,
863 High Street
Armadale Vic 3143

Invoice #: 00002860
Date: 28/01/2023

COMMERCIAL OPERATORS REGISTERED LICENCE NO. 126

DATE	DESCRIPTION	AMOUNT	CODE
25/01/2023	MG PASTORAL DFC #041 Completion date of a highly intensive spot spraying program at Karabeal, Victoria, services supplied by a large Small Farm Contracting contingent using spot spraying equipment. Work commenced on sites 2 &5 particularly targeting Phalaris, Scotch Thistle and Canary Grass weeds and followed by sites 3, 4 &5. Work was slow due to the tremendous growth and height of all weeds, caution on fire hazard days, risk of snake bites due to the height of growth,uneven ground due to rat holes and wet soil. As directed work had to be spot spraying on foot-vehicles not permitted in the spray program as would be usual in a number of the areas. 16 850 litres of chemical applied. Report and Images to be supplied . $39 293+GST Always committed to best practice and positive outcomes, the Small Farm Contracting team continues to value the opportunity to contribute to the significant management of Karabeal. Kind regards, Graham Hewitt Manager	$43,222.30	GST

Payment by Cheque to Postal Address or Electronic Funds Transfer (EFT)
*****PLEASE NOTE: NEW BANK DETAILS BELOW*****

EFT DETAILS:
Account Name: Small Farm Contracting
Bank: Bendigo Bank
BSB: 633-108
ACCOUNT NUMBER 1559 - 95590

GST:	$3,929.30
Total Inc GST:	$43,222.30
Amount Applied:	$0.00
Balance Due:	$43,222.30

BIOMASS BURN
AUG '22
STH WEST CNR
OF SITE 1,
LOOKING STH

RESHOOT OF KANG GRASS, BIOMASS BURN AUG '22

BIOMASS BURN ~~STH~~ NTH OF CREEK, STH WEST CNR OF SITE I LOOKING NTH WEST

SPOT SPRAYING OF PHALARIS

PHALARIS + CANARY GRASS

CANARY GRASS EXTENT.

PHALARIS EXTENT + MATURITY of CANARY GRASS

10th March 2023

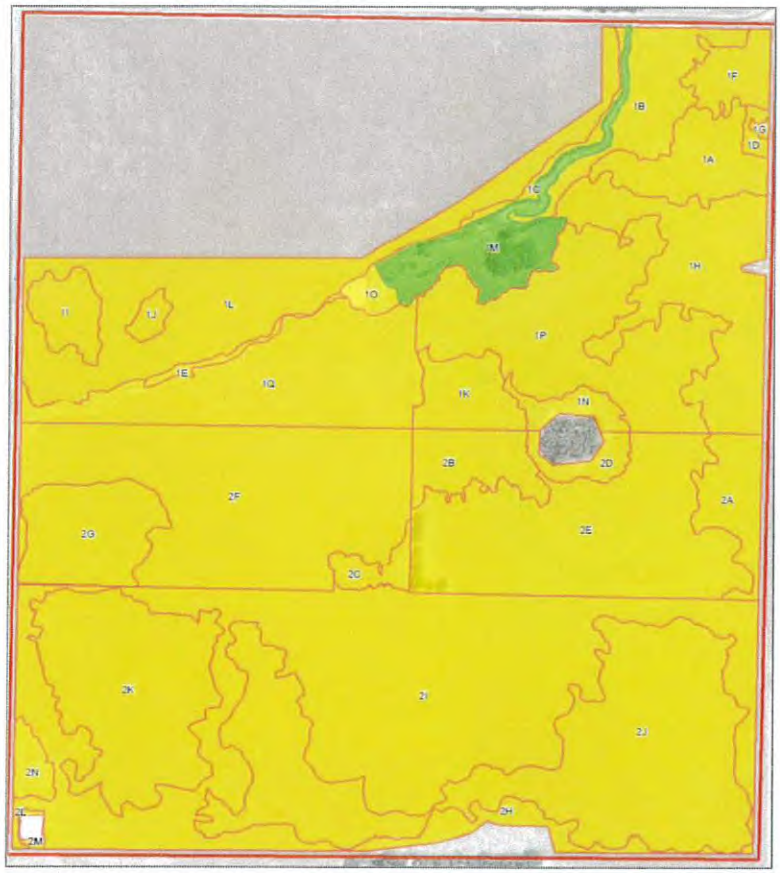
MG Pastoral

Attention: Marshall Dennis
By email – marshall.dennis@denniscorp.com.au

Dear Marshall,

RE: KARRABEAL OFFSET SITE MANAGEMENT ADVICE PROJECT NUMBER 22192.01

The following outlines the findings of an overview of the condition of native vegetation and adaptive management actions recommended to be implemented in addition to those stipulated in the approved Offset Management Plan. Not all Zones from each site were examined during the site assessment, and delineation of different Zones was difficult in most cases other than in association with aquatic environments. Grass identification was hampered by the young stage of growth/resprouting in many areas, but differentiating native and non-native was achievable. For reference, the Zone Plan is reproduced below.



Nature Advisory Pty Ltd
ABN 12 095 541 334
(Formerly Brett Lane & Associates Pty Ltd)

5/61-63 Camberwell Road Hawthorn East, VIC 3123
PO Box 337, Camberwell VIC 3124
(03) 9815 2111 www.natureadvisory.com.au

Karrabeal

Zone 1I, 1J, 1L and 1Q – Condition

Plains Grassland with dominated by Kangaroo Grass with low Wallaby Grass and Spear Grass cover. Native forb diversity and cover low. Very high cover of introduced annual grasses, especially Sweet Vernal-grass and Yorkshire Fog where mosaic burn has created inter-tussock spaces. Toowoomba Canary-grass, Onion Grass and Flatweed throughout; mature plants of the former controlled, the latter in sporadic high-density infestations. Spear Thistle present as young plants, suggesting recent control.

Despite what appears to be low-quality patches, the outcomes of the ecological burn have been successful, but will need follow-up, as the remaining weeds, although at high cover, will not endure a sustained management effort like the native grasses will.

Evidence of burrowing and runs created by small mammals – likely native bush rats. These were not considered problematic but should be monitored for accurate identification and any detrimental increase in activity.

Table 1: Main native components of Karrabeal Zone 1A

Common name	Scientific name
Grassland Wood-sorrel	*Oxalis perennans*
Kangaroo Grass	*Themeda triandra*
Sheep's Burr	*Acaena × ovina*
Spear Grasses	*Austrostipa* spp.
Sundew	*Drosera* sp.
Wallaby Grasses	*Rytidosperma* spp.

Table 2: Main weed components of Karrabeal Zone 1A

Common name	Scientific name
Annual grasses	
Flatweed	*Hypochaeris radicata*
Onion Grass	*Romulea rosea*
Rough Dog's-tail	*Cynosurus echinatus*
Spear Thistle	*Cirsium vulgare*
Toowoomba Canary-grass	*Phalaris aquatica*
Yorkshire Fog	*Holcus lanata*

Zone 1L: Kangaroo Grass resprouting post-ecological burn, with resulting bare ground colonised by introduced annual grasses such as Sweet Vernal-grass, and the perennial Yorkshire Fog. Onion Grass was also common. Low cover of native broad-leafed herbs between tussocks suggests such elements have been largely outcompeted from the site, but additional mosaic burning will eventually overcome the introduced grasses.

Zone 1L: Runs, burrows and mounds from small mammal activity – currently not excessively impacting native grasses as burrowing occurs between perennial tussock-grass root masses.

Zone 1L: Overall density of native grasses is high, forming good structure to the grassland. Ongoing management of annual weeds and Yorkshire Fog will allow other species to colonise.

Zone 1I, 1J, 1L and 1Q – Recommendations: 1-year adaptive management actions

- Conduct additional autumn ecological burn.
- Pulse graze with sheep after winter growth of introduced grasses.
- The offset site is established to protect biodiversity, including native fauna. Therefore, it is recommended to monitor animal activity and if impacts are significantly increased, set up camera traps to determine species responsible for burrowing and develop a response if needed.

Zone 1O – Condition

Grassland surrounding dam featuring high cover of native grasses, especially Spear Grass, with good cover of Kangaroo Grass, Wallaby Grass and Common Wheat-grass. Weed cover dominated by Yorkshire Fog and Capeweed, with Sow Thistle and Onion Grass in low cover. Toowoomba Canary-grass controlled.

Table 3: Main native components of Karrabeal Zone 10

Common name	Scientific name
Common Wheat-grass	*Anthosachne scabra*
Kangaroo Grass	*Themeda triandra*
Spear Grasses	*Austrostipa* spp.
Sundew	*Drosera* sp.
Wallaby Grasses	*Rytidosperma* spp.

Table 4: Main weed components of Karrabeal Zone 10

Common name	Scientific name
Capeweed	*Arctotheca calendula*
Onion Grass	*Romulea rosea*
Sow Thistle	*Sonchus oleracea*
Sweet Vernal-grass	*Anthoxanthum odoratum*
Toowoomba Canary-grass	*Phalaris aquatica*
Yorkshire Fog	*Holcus lanata*

Zone 10: High cover of Onion Grass (left) and Grey Box recruitment with understorey of Spear Grasses, Wallaby Grasses, and high cover of weeds due primarily to Toowoomba Canary-grass (treated), Yorkshire Fog and annual grasses such as Wild Oat (right).

Zone 10 – Recommendations: 1-year adaptive management actions

- Spot spray Yorkshire Fog and Capeweed.
- Consider autumn burn to reduce biomass and control annual grasses and Yorkshire Fog, followed by pulse grazing in spring.

Zone 1M – Condition

Woodland of different micro-habitats highly variable in condition, structure, and threats, means that management of this Zone as a unified whole is difficult because requirements drastically differ throughout.

Understorey generally dominated by a high cover and good diversity of native grasses, especially Spear Grasses, though in parts is effectively non-native, the latter most extensive and apparent beneath the canopy of the largest River Red-gum and to the east. Good inter-tussock spacing and good cover and diversity of native broad-leafed herbs, including Raspworts, Sundews, Blue Devil, evident. Evidence of light grazing by Eastern Grey Kangaroo.

Mass recruitment events of River Red-gum has created overly dense stands which will require thinning to prevent overcrowding and resultant loss of understorey diversity and shading for weeds.

Planted non-indigenous species—Giant Honey-myrtle, Blue Gum and Large-fruited Yellow-gum—are also recruiting and need to be removed as they are outcompeting local species and providing shade for weeds to prosper. Localised infestations of Toowoomba Canary-grass, with broad-leafed weeds Flatweed and Buck's-horn Plantain establishing under hoist, shady conditions.

Banks of the waterway were found to be suffering mild erosion effects, but most of these areas were well established and soil integrity protected by the roots of native vegetation such as Tussock Grasses and a high cover of mosses, lichens, and algae.

Old fencing remnants require removal to avoid potential injury to native fauna.

Table 5: Main native components of Karrabeal Zone 1M

Common name	Scientific name
Black Wattle	*Acacia mearnsii*
Blue Devil	*Eryngium ovinum*
Kangaroo Grass	*Themeda triandra*
Kidney Weed	*Dichondra repens*
Raspwort	*Gonocarpus* sp.
River Red-gum	*Eucalyptus camaldulensis*
Rough Raspwort	*Haloragis aspera*
Small St John's Wort	*Hypericum gramineum*
Spear Grasses	*Austrostipa* spp.
Sheep's Burr	*Acaena* × *ovina*
Sundews	*Drosera* spp.
Tussock Grass	*Poa* sp.
Varied Raspwort	*Haloragis heterophylla*
Wallaby Grasses	*Rytidosperma* spp.

Table 6: Main weed components of Karrabeal Zone 1M

Common name	Scientific name
Annual Veldt-grass	*Ehrharta longiflora*
Blue Gum	*Eucalyptus globulus*
Buck's-horn Plantain	*Plantago coronopus*
Flatweed	*Hypochaeris radicata*
Giant Honey-myrtle	*Melaleuca armillaris*
Large-fruited Yellow-gum	*Eucalyptus leucoxylon* subsp. *macrocarpa*
Onion Grass	*Romulea rosea*
Rough Dog's-tail	*Cynosurus echinata*
Rye	*Lolium* sp.
Sweet Vernal-grass	*Anthoxanthum odoratum*
St John's Wort	*Hypericum perforatum*
Toowoomba Canary-grass	*Phalaris aquatica*
Yorkshire Fog	*Holcus lanatus*

Zone 1M: Area of high-quality native groundcover dominated by Tussock Grasses with good diversity of broad-leafed herbs and high moss cover.

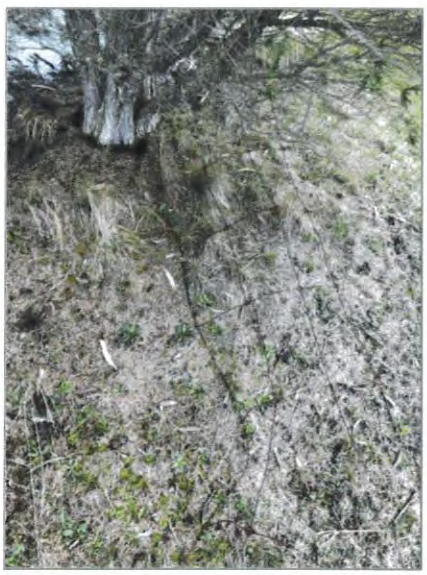
Zone 1M: Tussock Grasses and mosses maintain streambank integrity and preventing erosion.

Zone 1M: Buck's-horn Plantain establishing among good diversity of native grasses and broad-leafed herbs. Open ground well covered with intact biological crusts.

Zone 1M: Understorey beneath canopy of large River Red-gum devoid of native components, dominated by annual grasses including Rye, Sweet Vernal-grass, and Annual Veldt-grass (Toowoomba Canary-grass controlled).

Zone 1M: Mass recruitment of River Red-gum requiring ecological thinning. Exposed streambank well colonised with native grasses, mosses, lichens, and algal crusts.

Zone 1M: Giant Honey-myrtle, Blue Gum, and Large-fruited Yellow-gum are recruiting and require removal.



Zone 1M: Old fencing requiring removal. Infestation of Flatweed also evident in shade of Giant Honey-myrtle (right).

Zone 1M: Eastern boundary adjacent to Zone 1P dominated by Toowoomba Canary-grass.

Zone 1M – Recommendations: 1-year adaptive management actions

- Spot spray/wipe Flatweed and Buck's-horn Plantain with a suitable broad-leaf herbicide.
- Large areas of Toowoomba Canary-grass should be burnt in autumn.
- Remove non-indigenous woody species: Blue Gum, Giant Honey-myrtle, and Large-fruited Yellow-gum. These should be cut down and stumps left undisturbed to prevent soil disturbance and retain stability, otherwise weed colinisation and erosion are likely to result. Large logs/branches from cut trees should be left on site for fauna habitat, but denser material should be removed.
- Ecological thinning of River Red-gum recruits/immature trees. Failure to do so will result in poor tree development and little chance for native understorey survival. Note that approval must be sought from the responsible authority to remove native vegetation for conservation purposes, and therefore it is recommended that the Offset Management Plan be amended to explicitly allow for this practice.
- To maintain streambank integrity and prevent erosion, stock should not be grazed in this area.
- Remove rubbish including old fencing to prevent harm to native fauna and remove or disperse log piles/large weed debris to reduce pest animal harbour.
- Treat for control of Onion Grass (with metsulfuron-methyl herbicide and an appropriate surfactant, using a wiping application method) in late winter/early spring, 6-8 weeks after emergence of growth from new corms. Treatment will be ineffective if applied too late (such as

when the tips of leaves begin to show discoloration/browning from fungal infection). Note that this could be deferred until the next year to allow focus or more immediate actions.

Zone 1A – Condition

Good cover and diversity of native grasses, recovering well from ecological burn, but with introduced annual grasses and Yorkshire Fog colonising heavily afterward. The latter is at very high cover (up to 60%) requiring primary focus on reduction, while Onion Grass cover is also very high.

Table 7: Main native components of Karrabeal Zone 1A

Common name	Scientific name
Blue Devil	*Eryngium ovinum*
Kangaroo Grass	*Themeda triandra*
Lemon Beauty-heads	*Calocephalus citreus*
Kangaroo Grass	*Themeda triandra*
Sheep's Burr	*Acaena × ovina*
Small St John's Wort	*Hypericum gramineum*
Spear Grasses	*Austrostipa* spp.
Tussock Grass	*Poa* sp.
Wallaby Grasses	*Rytidosperma* spp.

Table 8: Main weed components of Karrabeal Zone 1A

Common name	Scientific name
Annual grasses	
Flatweed	*Hypochaeris radicata*
Onion Grass	*Romulea rosea*
Rough Dog's-tail	*Cynosurus echinata*
Rye	*Lolium* sp.
Sweet Vernal-grass	*Anthoxanthum odoratum*
Toowoomba Canary-grass	*Phalaris aquatica*
Yorkshire Fog	*Holcus lanata*

Zone 1B: Native grasses, primarily Kangaroo Grass and Spear Grasses, heavily invaded by Yorkshire Fog, Onion Grass, Sweet Vernal Grass and other annual grasses. Ecological burning is the most effective and efficient means of control for this scenario but requires follow up with additional control of weeds recolonising.

Zone 1A: Controlled Toowoomba Canary-grass in area dominated by other introduced grasses with low native vegetation cover.

Zone 1A: Burnt area heavily colonised by weeds, primarily Yorkshire Fog, Onion Grass, Flatweed, Sweet Vernal-grass and other annual grasses.

Zone 1A – Recommendations: 1-year adaptive management actions

- Spot spray/wipe Flatweed with a suitable broad-leaf herbicide.
- Conduct additional ecological burn in autumn to control Yorkshire Fog. Though labour-intensive, it would be beneficial to follow up with chemical control by spot spraying with a suitable graminoid herbicide in early spring to control resprouting plants and new recruits.
- Treat for control of Onion Grass (with metsulfuron-methyl herbicide and an appropriate surfactant, using a wiping application method) in late winter/early spring, 6-8 weeks after emergence of growth from new corms. Treatment will be ineffective if applied too late (such as when the tips of leaves begin to show discoloration/browning from fungal infection).

Zone 1N, 1K, 2B, 2D, 2E, 2I & 2K – Condition

These areas have been overrun with introduced species, predominantly dense infestations of Yorkshire Fog (representing up to 75% of the total cover). No management actions have been recommended for these areas, but the implications are discussed below.

Zone 1D: Part of the area surrounding excluded stand of Sugar Gum. Grassland is now dominated by introduced species, primarily annual grasses such as Rye, Sweet Vernal-grass, and Annual Veldt-grass, as well as Capeweed and Onion Grass. Native vegetation coverage was low. It is unclear what has driven this change, but if sheep have been grazed in the area it is likely they have contributed due to seeking refuge among the nearby trees and concentrating grazing and nutrient elevation in the vicinity.

Zone 2E: Grassland in this area has been overrun but Yorkshire Fog, with other introduced grasses making up the remainder and cover of native elements was low. This transition cannot be attributed to recent conditions and is evident of gradual change due to lack of management of invasive species.

Zone 2I: Dominated by Yorkshire Fog, Toowoomba Canary-grass and introduced annual grasses.

Zone 2F & 2G – Condition

Good cover and diversity of native grasses, recovering well from ecological burn, but with Yorkshire Fog and annual grasses colonising heavily afterward.

Very high cover of Onion Grass and, in some areas, Flatweed.

Table 9: Main native components of Karrabeal Zone 2F & 2G

Common name	Scientific name
Blue Devil	*Eryngium ovinum*
Bluebell	*Wahlenbergia* sp.
Cudweed	*Euchiton* sp.
Grassland Wood-sorrel	*Oxalis perennans*
Kangaroo Grass	*Themeda triandra*
Sheep's Burr	*Acaena* × *ovina*
Spear Grasses	*Austrostipa* spp.
Tussock Grass	*Poa* sp.
Wallaby Grasses	*Rytidosperma* spp.

Table 10: Main weed components of Karrabeal Zone 2F & 2G

Common name	Scientific name
Annual grasses	
Flatweed	*Hypochaeris radicata*
Onion Grass	*Romulea rosea*
Rye	*Lolium* sp.
Sweet Vernal-grass	*Anthoxanthum odoratum*
Toowoomba Canary-grass	*Phalaris aquatica*
Wild Oat	*Avena* sp.
Yorkshire Fog	*Holcus lanata*
Annual grasses	

Zone 2G: Good cover and diversity of native grasses. Annual introduced grasses including Sweet Vernal-grass, Rye, and Wild Oat, and high cover of Yorkshire Fog colonising spaces post-burn. Old fencing wire requiring removal.

Zone 2G: Onion Grass and Flatweed infestations. The latter will quickly outcompete native species.

Zone 2G: Unburnt area with good native grass cover but heavily infested with Onion Grass.

Zone 2F – Recommendations: 1-year adaptive management actions

- Spot spray/wipe Flatweed with a suitable broad-leaf herbicide.
- Conduct additional ecological burn in autumn to control annual grasses and Yorkshire Fog.
- Remove old fencing to prevent harm to native fauna.
- Treat for control of Onion Grass (with metsulfuron-methyl herbicide and an appropriate surfactant, using a wiping application method) in late winter/early spring, 6-8 weeks after emergence of growth from new corms. Treatment will be ineffective if applied too late (such as when the tips of leaves begin to show discoloration/browning from fungal infection).

Conclusion

Further, more detailed assessment is required to determine the condition of remaining zones and to quantify the extent of losses in those no longer qualifying as native vegetation.

It is recommended that a skilled native grassland restoration contractor be consulted for further action and remediation and for development of a more nuanced and comprehensive management plan, in consultation with the responsible authority. Scraping of infested areas and seeding with native grasses may be a viable option. Regardless, the extent of weed infestation throughout requires a highly competent and thorough management crew.

I trust the above provides suitable initial guidance for remedial actions for the next year, after which time a more thorough assessment should be undertaken. Please contact me if you have any questions or comments.

Yours sincerely,

Chris Dunk

Senior Ecologist & Project Manager
Nature Advisory Pty Ltd

(03) 9815 2111 | chris@natureadvisory.com.au

Appendix 8: Campbelltown offset site, Year 6 (2023) annual report

Marshall G. Dennis

From: Marshall G. Dennis
Sent: Monday, 5 June 2023 3:43 PM
To: nativevegetation.offsetmanagement@delwp.vic.gov.au
Subject: BB 3004 LAO 1 - Campbelltown - M.G. Pastoral Co. Pty. Ltd.
Attachments: 20230605_153545.pdf

-----Original Message-----
From: glenferrie@denniscorp.com.au <glenferrie@denniscorp.com.au>
Sent: Monday, June 5, 2023 3:36 PM
To: Marshall G. Dennis <Marshall.dennis@ranfurlieam.com.au>
Subject: Scanned image from Sharp MFD

Reply to: glenferrie@denniscorp.com.au <glenferrie@denniscorp.com.au> Device Name: Dennis Family Corp Device
Model: MX-5071
Location: 2-6 Glenferrie Rd, Malvern

File Format: PDF (Medium)
Resolution: 200dpi x 200dpi

Attached file is scanned image in PDF format.
Use Acrobat(R)Reader(R) or Adobe(R)Reader(R) of Adobe Systems Incorporated to view the document.
Adobe(R)Reader(R) can be downloaded from the following URL:
Adobe, the Adobe logo, Acrobat, the Adobe PDF logo, and Reader are registered trademarks or trademarks of Adobe Systems Incorporated in the United States and other countries.

http://www.adobe.com/

Department of Environment Land, Water & Planning Annual Report Form

Enter management year here: Year ____6_____

Management Agreement: BB- 3004 LA0 1

Enter Landowner name(s) here:
M.G. Pastoral Co.P/L

Site Code: Campbelltown Sites : 01, 02, 03 & 04.

Site-Zone	Standard to be achieved	Management action description	Timing	Action Completed (Yes/No)	Description of Actions and observed outcomes (Include or attach evidence of actions completed / comments / observed outcomes)
All Sites	Maintain boundary fences to stockproof condition, and erect fencing to all sites to DELWP fencing standards	Repair and maintain the boundary perimeter fence of the property to stock proof standard and erect new fencing around each site to DELWP (stock/vermin proof) standards	Boundary ; within 3 months of agreement commenc'mt Sites : within 12 months	Yes	Boundary fences were repaired and maintained as required within the first 12 months, noting there were no grazing animals (very minimal strays) on the property during this period. Each respective offset site polygon was GPS'd and mapped. The polygons were subsequently pegged (with buffer margins) and fences progressively erected in Dec. '17 and Jan'18. All site fences have been constructed to DELWP stockproof standards or DELWP vermin proof standards.
All Sites	Elimination of all woody weeds in the credit sites	Elimination of Hawthorn Sweet briar and all other woody weeds by the end of year 2. Eliminate all other woody weeds.	Autumn & Spring Ongoing	Yes	Hawthorn bush, *Crataegus monogyna,* were mostly eliminated in the Spring of Yr. 1 and remnants in Yr.2. Sweet Briar Rose, *Rosa rubiginosa,* were mostly eliminated in both Spring & Autumn of Yr. 1 and remnants in Yr. 2. Cut and pint with suitable herbicide (neat Glyphosate) within 20 seconds, was the method undertaken.
All Sites	Monitor, treat and eliminate emerging woody weeds	Visual detection of all emerging woody weeds throughout the respective management years. Treat emerging plants as detected and continue to monitor.	Ongoing	Yes, but ongoing	Continue to monitor and treat emerging woody weeds - Hawthorn, Sweet Briar and others. This action is routinely undertaken. Minimal emergence of woody weeds now; this action is under control.
All Sites	Control of herbaceous Weeds	Ensure weed cover does not increase beyond the levels at the commencement of the agreement, and treat weeds as directed within the OMP.	Spring	Yes, but ongoing	Spot spraying and 'wanding' using selective herbicide at recommended rates, was undertaken on Phalaris, *Phalris spp,* various Thistles, *Chrisium spp.*, St. John's Wort, *Hypericum perforatum,* & Dock Weed, *Rumex spp.*in late Dec. '22 due to seasonal conditions and availability of contractors. Albeit, it was not the ideal timing as per the OMP, good control kill rates were achieved. This action continues to be WIP.

Site-Zone	Standard to be achieved	Management action description	Timing	Action Completed (Yes/No)	Description of Actions and observed outcomes (Include or attach evidence of actions completed / comments / observed outcomes)
All Sites	Monitoring and control of new and emerging herbaceous weed	New and emerging herbaceous weeds are to be monitored and controlled throughout the respective year of the OMP.	Ongoing	Yes, but ongoing.	Continue to monitor and control as required herbaceous weeds, utilising actions and herbicides (incl. recommended rates) suitable to each spp. throughout the year.
All Sites	Pest animal control.	Monitor and control pest animals incl. foxes and rabbits within the respective sites.	Ongoing	Yes, but ongoing	Perimeter fence around each site was visually inspected by both Contractor(s) and LO on each visit to the property. There has been no evidence of rabbit burrows re-opening, and no new burrows apparent. Some minor re-straining of plain wires were undertaken on site 3; slackness is as a result of ground movement (moisture). There has been no evidence of fox infestation.
Site 2	Overabundant Macropods in Site 2	In repsone to DELWP's observation in July '22, monitor and observe the over abundance of Macropods, by installing grazing prevention enclosures, and if deemed problematic seek permission to undertake a controlled cull.	Ongoing	Yes, but ongoing.	Pasture enclosures were installed on 29/7/'22, consisting of 1200x1200x600 galvanised steel mesh. Direction for DELWP was to inspect after 12 months and make assessment of relative pasture growth both inside and outside of the enclosure. This will determine if the macropods are putting too much grazing pressure on the NV offset sites and whether a cull program needs to be approved and acted upon.
Sites 2A, 3A 4A & 4B	Ecological Biomass Burning	Ecological mosaic burning of biomass on a regular but rotating program, with less than 50%of each site burnt per day and less than 80% of each site burnt each year.	Ongoing	Yes, but ongoing	Site 3 was 'cold' burnt in May '22, with a relatively good burn achieved in accordance with percentage parameters of <50% burnt in each day and <80% burnt each year.

Site-Zone	Management Action	Management action description	Timing	Completed (Yes/No)	Include or attach supporting evidence of actions completed / comments / observations
	Annual reporting				
All	Annual report is signed, dated and submitted by the landowner at least 1 month before the anniversary date of the agreement The annual report is a useful opportunity to make comprehensive comments and observations, giving a picture of the current condition of the site(s), issues identified, works undertaken and actions still required. You are encouraged to create a separate report to include in your annual reporting each year that captures this detailed information. The benefits of monitoring your vegetation condition and identifying issues and management undertaken, is that it aids you to gauge the success of management on the condition of native vegetation over time. The Department is also able to use this information to assist with the assessment of your compliance with the agreement and provides us with useful information and data for future management advice. Obligations of the landowner (compliance with section 6 of the Landowner Agreement) have been met, and I have read, signed, dated and submitted the obligations form with the annual report.	Prepare and submit an annual report providing evidence of works carried out. Where the actions were not carried out provided evidence as to the reason why. Include supporting evidence by: - detailed written observations & additional report - photo point monitoring - map of zones & photo points - photographs of works undertaken - receipts/invoices for materials & works carried out, including by contractors - log books of works carried out - obligations of the landowner form - payment method is correct - Receipts of seeds / seedlings ordered or purchased including a table/list of the species, numbers of each species (can estimate if using seeds), provenance - Site log - table/list of numbers of species planted/recruiting or germinated, including: numbers of each species by life form that are present/survived and/or were replaced for that year	Submit at least 1 month prior to agreement anniversary date		obligations of the landowner form where applicable: payment method is correct detailed written observations & additional report photo point monitoring map of zones & photo points photographs of works undertaken receipts/invoices for works carried out, including by contractors log books of works carried out Receipts seeds/seedlings, provenance, table of species list & numbers Site log / table of plantings/germination & survival numbers by life form

I hereby declare that the supplied information is accurate and complies with reporting requirements under General Conditions under the Second Schedule of the DELWP Management Agreement.

Signed: .....

Date: 29 / 5 / 2023

G. R. Hewitt trading as

Small Farm Contracting Pty Ltd

A.B.N.: 30 608 262 942

POSTAL ADDRESS:
P.O. BOX 61, LEOPOLD 3224

TRADING ADDRESS:
30 Como Road, LEOPOLD 3224

Ph: (03) 5250 1693
Mob: 0417 044 464
Fax: (03) 5250 2743

Online:
www.smallfarmcontracting.com.au
Email: grahamrhewitt@gmail.com

Tax Invoice

Bill To:

MG Pastoral Co.Pty Ltd DFC#041
Level 4,
863 High Street
Armadale Vic 3143

Invoice #: 00002797
Date: 16/05/2022

COMMERCIAL OPERATORS REGISTERED LICENCE NO. 126

DATE	DESCRIPTION	AMOUNT	CODE
10/05/2022	Company Code: DFC#041 Small Farm Contracting team Campbelltown Bush broker Cold Burn, fence removal and weed control completion. Small Farm Contracting team works included: Site 1: Removal all remaining fence wire. Site 3: Registration of fire burn on site 3 with Vic Fire-details supplied of burn. Cold burn. Please see photographs forwarded. Spot spraying of St John's Wort in Site 1. Always committed to best practice and optimal outcomes, Small Farm Contracting was committed to your important and significant project at Campbelltown of fence removal, cold burn and crucial weed elimination. Kind regards, Graham Hewitt Manager.	$6,028.00	GST

Payment by Cheque to Postal Address or Electronic Funds Transfer (EFT)
*****PLEASE NOTE: NEW BANK DETAILS BELOW*****

EFT DETAILS:
Account Name: Small Farm Contracting
Bank: Bendigo Bank
BSB: 633-108
ACCOUNT NUMBER 1559 - 95590

GST:	$548.00
Total Inc GST:	$6,028.00
Amount Applied:	$0.00
Balance Due:	$6,028.00

G. R. Hewitt trading as

Small Farm Contracting Pty Ltd

A.B.N.: 30 608 262 942

POSTAL ADDRESS:
P.O. BOX 61, LEOPOLD 3224

TRADING ADDRESS:
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Ph: (03) 5250 1693
Mob: 0417 044 464
Fax: (03) 5250 2743

Online:
www.smallfarmcontracting.com.au
Email: grahamrhewitt@gmail.com

Tax Invoice

Bill To:

MG Pastoral Co.Pty Ltd DFC#041
Level 4,
863 High Street
Armadale Vic 3143

Invoice #: 00002805
Date: 19/06/2022

COMMERCIAL OPERATORS REGISTERED LICENCE NO. 126

DATE	DESCRIPTION	AMOUNT	CODE
8/06/2022	MG Pastoral Co.Pty Ltd DFC#041 Bush broker site #1.Campbelltown. Spot spraying of entire site for newly emerging St.John's Wort weeds at Campbelltown. Broadleaf chemical spray MCPA 750 applied. With best practice and commitment to optimal outcomes, we continue to enjoy providing our tailor-made services for the property development and maintenance programs for MG Pastoral. Kind regards, Graham Hewitt Manager.	$2,270.40	GST

Payment by Cheque to Postal Address or Electronic Funds Transfer (EFT)
*****PLEASE NOTE: NEW BANK DETAILS BELOW*****

EFT DETAILS:
Account Name: Small Farm Contracting
Bank: Bendigo Bank
BSB: 633-108
ACCOUNT NUMBER 1559 - 95590

GST:	$206.40
Total Inc GST:	$2,270.40
Amount Applied:	$0.00
Balance Due:	$2,270.40

G. R. Hewitt trading as

Small Farm Contracting Pty Ltd

A.B.N.: 30 608 262 942

POSTAL ADDRESS:
P.O. BOX 61, LEOPOLD 3224

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Mob: 0417 044 464
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Online:
www.smallfarmcontracting.com.au
Email: grahamrhewitt@gmail.com

Tax Invoice

Bill To:

MG Pastoral Co.Pty Ltd DFC#041
Level 4,
863 High Street
Armadale Vic 3143

Invoice #: 00002857
Date: 13/01/2023

COMMERCIAL OPERATORS REGISTERED LICENCE NO. 126

DATE	DESCRIPTION	AMOUNT	CODE
6/01/2023	Completion date of highly intensive property management program at CAMPBELLTOWN Bush-broker sites, services supplied by the Small Farm Contracting team. Work involved: Site 2 spot spraying of St. John's Wort, Phalaris Sweet Briar Rose and Dock weeds. St.John Wort was a very dense infestation. Site 1 & 3 spot spraying of St. John's Wort , Phalaris, Thistles . Repair of boundary fence at Site 3 where kangaroos were entering. Site 4 spot spraying of St. John's Wort, Phalaris, Dock and Sweet Briar Rose weeds 1860 litres of weed-control chemical applied. Glysophate 450, Devour 1020 and Redeye. Always committed to best practice and optimal outcomes, the Small Farm Contracting team values the opportunities to contribute to your property management programs at Campbelltown. Kind regards, Graham Hewitt Manager.	$23,285.90	GST

Payment by Cheque to Postal Address or Electronic Funds Transfer (EFT)
*****PLEASE NOTE: NEW BANK DETAILS BELOW*****

EFT DETAILS:
Account Name: Small Farm Contracting
Bank: Bendigo Bank
BSB: 633-108
ACCOUNT NUMBER 1559 - 95590

GST:	$2,116.90
Total Inc GST:	$23,285.90
Amount Applied:	$0.00
Balance Due:	$23,285.90

1st February 2023

MG Pastoral

Attention: Marshall Dennis
By email – marshall.dennis@denniscorp.com.au

Dear Marshall,

RE: CAMPBELLTOWN OFFSET SITE MANAGEMENT ADVICE PROJECT NUMBER 22191.01

The following outlines the findings of an overview audit of the condition of native vegetation, threats to biodiversity, and adaptive management actions recommended to be implemented in addition to those stipulated in the approved Offset Management Plan,

Campbelltown

Site 1A – Condition

Grey Box canopy recruiting well with several cohorts. Box Mistletoe was common on mature Grey Box. Ground layer predominantly Spear Grasses and Wallaby Grasses. High cover of perennial, introduced grasses Toowoomba Canary-grass and Yorkshire Fog, very high cover of Onion Grass. Moderate cover of annual exotic grasses. One mature Cherry Plum present. Soil crust intact with high moss cover.

Table 1: Main native components of Campbelltown Site 1A

Common name	Scientific name
Box Mistletoe	*Amyema miquelii*
Grey Box	*Eucalyptus microcarpa*
Sheep's Burr	*Acaena × ovina*
Spear Grasses	*Austrostipa* spp.
Wallaby Grasses	*Rytidosperma* spp.

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(Formerly Brett Lane & Associates Pty Ltd)

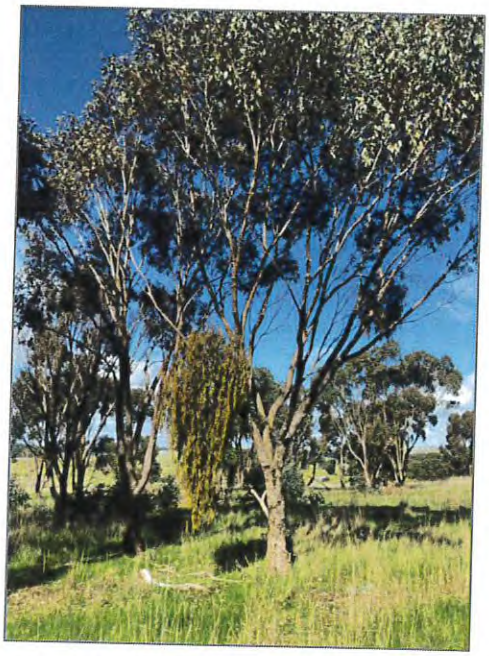
5/61-63 Camberwell Road Hawthorn East, VIC 3123
PO Box 337, Camberwell VIC 3124
(03) 9815 2111 www.natureadvisory.com.au

Table 2: Main weed components of Campbelltown Site 1A

Common name	Scientific name
Cherry Plum	*Prunus cerasifera*
Onion Grass	*Romulea rosea*
Rough Dog's-tail	*Cynosurus echinatus*
Rye	*Lollium* sp.
St John's Wort	*Hypericum perforatum*
Toowoomba Canary-grass	*Phalaris aquatica*
Wild Oat	*Avena* sp.
Yorkshire Fog	*Holcus lanata*

Site 1A: High cover of Onion Grass (left) and Grey Box recruitment with understorey of Spear Grasses, Wallaby Grasses, and high cover of weeds due primarily to Toowoomba Canary-grass (treated), Yorkshire Fog and annual grasses such as Wild Oat (right).

Site 1A: Onion Grass invading otherwise healthy understorey of sparse native grasses, moderate organic litter and intact soil crust with high moss cover.



Site 1A: Box Mistletoe on Grey Box.

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ABN 12 095 541 334
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PO Box 337, Camberwell VIC 3124
(03) 9815 2111 www.natureadvisory.com.au

Site 1A – Recommendations: 1-year adaptive management actions

- Spot spray Toowoomba Canary-grass, Yorkshire Fog and St John's Wort.
- Treat for control of Onion Grass (with metsulfuron-methyl herbicide and an appropriate surfactant, using a wiping application method) in late winter/early spring, 6-8 weeks after emergence of growth from new corms. Treatment will be ineffective if applied too late (such as when the tips of leaves begin to show discoloration/browning from fungal infection).
- Pulse grazing with sheep in early to mid-spring to prevent seed set of annual introduced grasses.
- Ensure no grazing by sheep through summer to limit dispersal of Onion Grass seeds.
- Remove Cherry Plum and Cootamundra Wattle (the latter outside the site perimeter).
- Incorporate monitoring of prevalence and density of Box Mistletoe and host tree health into the Offset Management Plan. Although Box Mistletoe is a naturally occurring, and ecologically important, parasite of Grey Box, there is the potential for this species to threaten the health and longevity of dispersed, isolated stands of trees such as those present in the offset site. The small Grey Box population size creates a scenario in which individual trees can become heavily infested creating an unbalanced relationship.

Site 2A – Condition

Dominated by a high cover of native grasses: Kangaroo Grass, Wallaby Grasses and Spear Grasses. Good inter-tussock spacing but few native broad-leafed herbs evident. Evidence of heavy grazing by Eastern Grey Kangaroo.

Weed cover high, primarily due to infestations of Onion Grass and Ribwort, approaching 25% total vegetation cover. Other weeds sparse, with occasional St John's Wort, a few Blackberry recruits, and Toowoomba Canary-grass. Total cover of these is at an acceptable level of <1%; evidence of previous control measures.

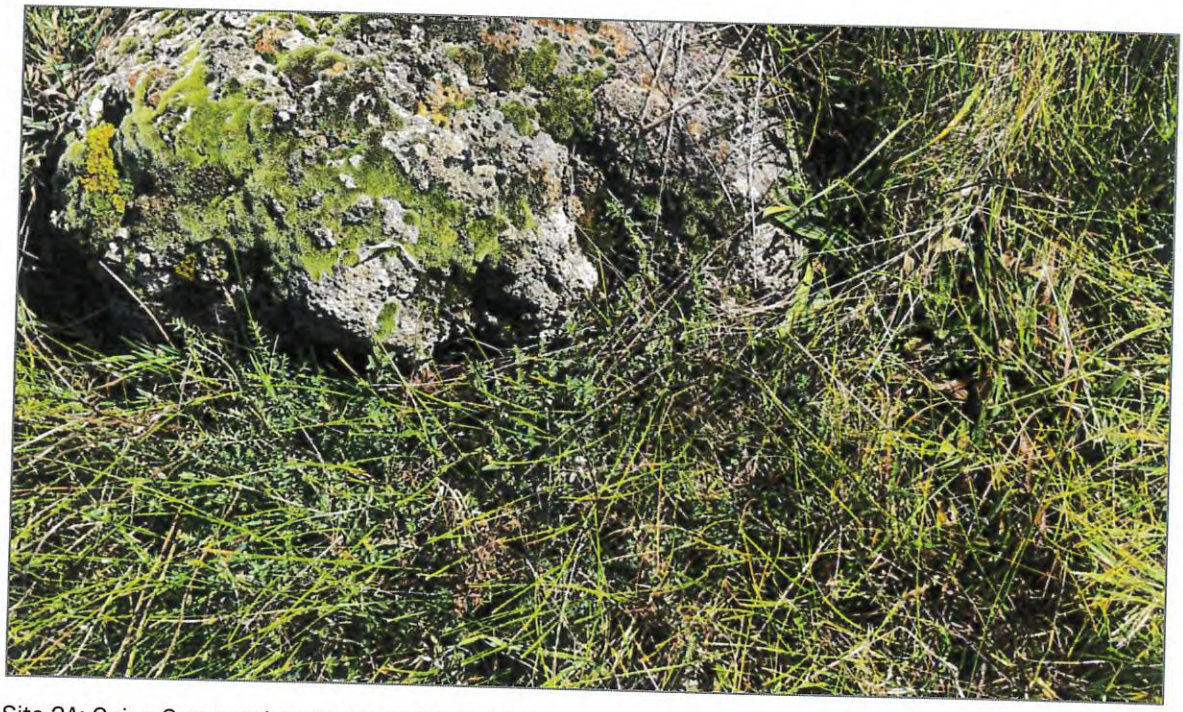
Controlled burn in December 2021 has managed biomass well but allowed colonisation by weeds from beyond the site.

Table 3: Main native components of Campbelltown Site 2A

Common name	Scientific name
Kangaroo Grass	*Themeda triandra*
Spear Grasses	*Austrostipa* spp.
Sheep's Burr	*Acaena × ovina*
Wallaby Grasses	*Rytidosperma* spp.

Table 4: Main weed components of Campbelltown Site 2A

Common name	Scientific name
Blackberry	*Rubus fruticosus* spp. agg.
Onion Grass	*Romulea rosea*
Ribwort	*Plantago lanceolata*
St John's Wort	*Hypericum perforatum*
Toowoomba Canary-grass	*Phalaris aquatica*



Site 2A: Onion Grass and scattered St John's Wort.

Site 2A: Dense cover of Onion Grass and Ribwort.

Site 2A: Grazing, likely from Eastern Grey Kangaroo.

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(Formerly Brett Lane & Associates Pty Ltd)

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Site 2A – Recommendations: 1-year adaptive management actions

- Spot spray/wipe Ribwort with a suitable broad-leaf herbicide.
- Treat for control of Onion Grass (with metsulfuron-methyl herbicide and an appropriate surfactant, using a wiping application method) in late winter/early spring, 6-8 weeks after emergence of growth from new corms. Treatment will be ineffective if applied too late (such as when the tips of leaves begin to show discoloration/browning from fungal infection).
- Ensure no grazing by sheep through summer to limit dispersal of Onion Grass seeds.
- Audit existing fencing for breaches and ensure rabbit-proofing measures are complete and not compromised.

Site 3A – Condition

Ground layer predominantly Spear Grasses and Wallaby Grasses, with a good cover of broadleafed herbs between. Very high cover of Ribwort, especially in areas regenerating from controlled burn the previous autumn. Onion Grass and annual introduced grasses such as Wild Oat present at very high cover high in these areas too, but less severe in the remainder.

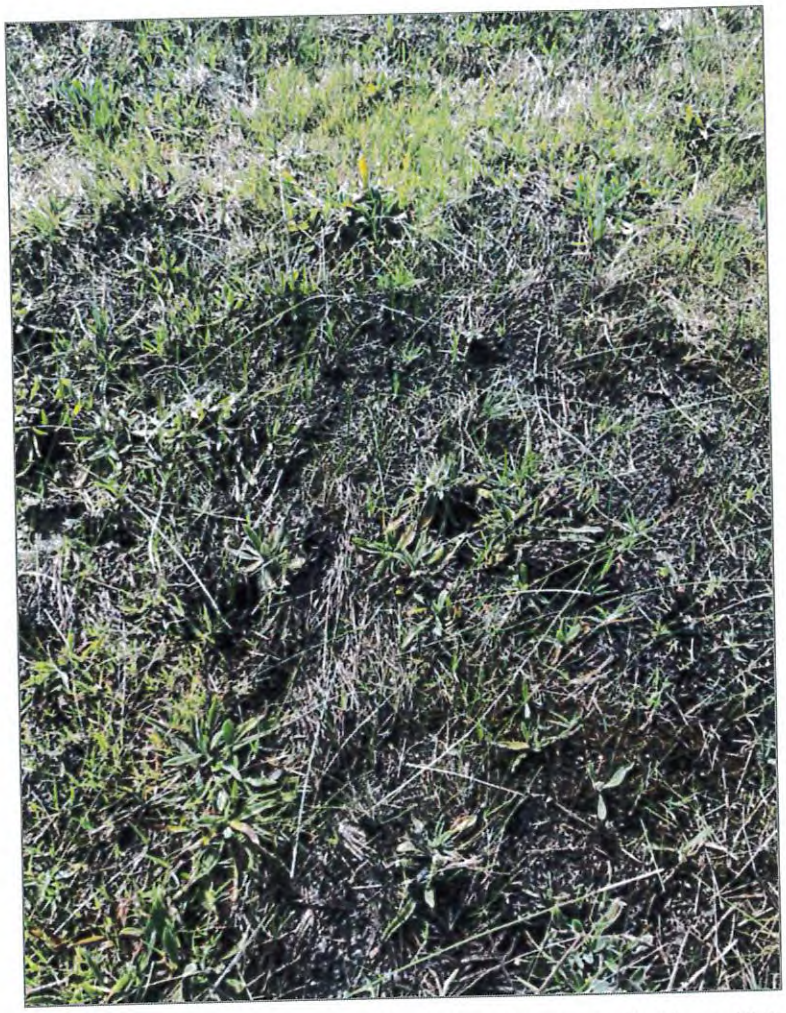
Cover of Toowoomba Canary-grass low overall (<1%) but present at moderately high concentrated in isolated areas, primarily beyond burn regions. Moderate cover of annual exotic grasses. Capeweed infestation establishing in burn areas, along with Spear Thistle, though the latter recently controlled and low in alive numbers. Briar Rose present but all specimens dead as a result of past control measures.

Table 5: Main native components of Campbelltown Site 3A

Common name	Scientific name
Bidgee-widgee	*Acaena novae-zelandiae*
Spear Grasses	*Austrostipa* spp.
Sheep's Burr	*Acaena × ovina*
Wallaby Grasses	*Rytidosperma* spp.
Wattle Mat-rush	*Lomandra filiformis*

Table 6: Main weed components of Campbelltown Site 3A

Common name	Scientific name
Annual grasses	
Capeweed	*Arctotheca calendula*
Onion Grass	*Romulea rosea*
Ribwort	*Plantago lanceolata*
Spear Thistle	*Cirsium vulgare*
St John's Wort	*Hypericum perforatum*
Toowoomba Canary-grass	*Phalaris aquatica*
Wild Oat	*Avena* sp.



Site 3A: Native grass tussocks regenerating after controlled burn. High cover of Onion Grass, with introduced annual grasses sprouting and infestation of Ribwort having colonised spaces created by biomass reduction.

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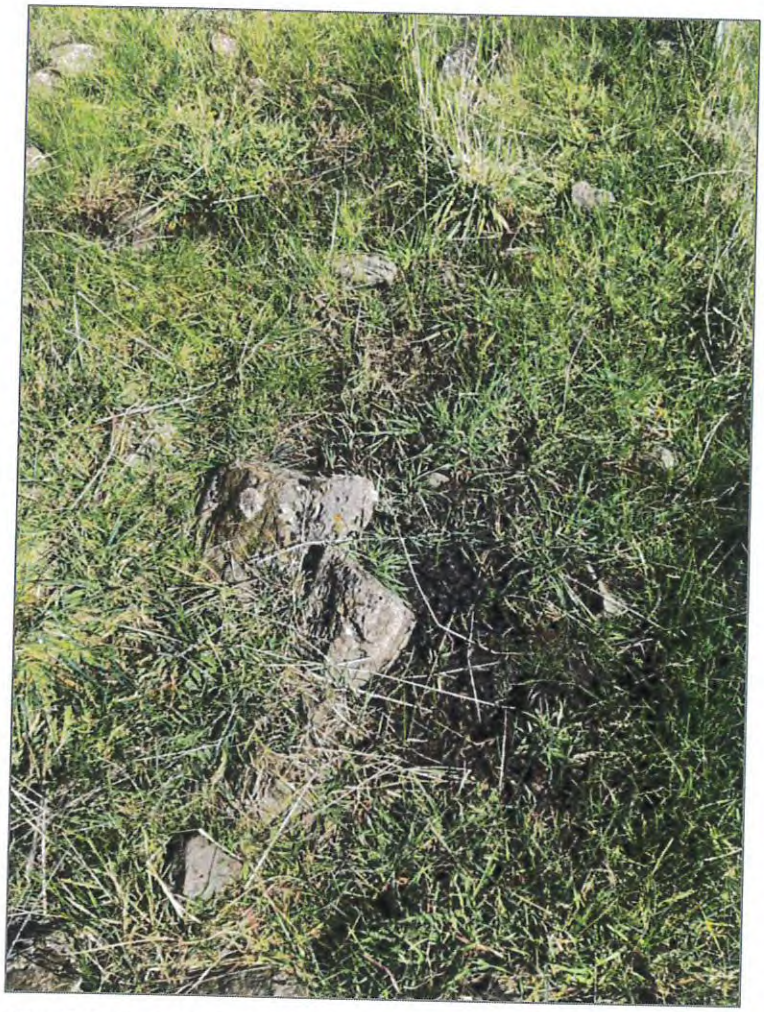

Site 3A: High cover of introduced annual grasses with moderate cover of Toowoomba Canary-grass.

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Site 3A: Broad-leafed herbs Sheep's Burr and Bidgee-widgee with native grass tussocks between embedded rocks, recovering well from controlled burn. High cover of annual introduced grasses sprouting in nutrient-elevated soil post-burn.

Site 3A – Recommendations: 1-year adaptive management actions

- Spot spray/wipe Ribwort, Capeweed and Spear Thistle with a suitable broad-leaf herbicide, especially after controlled when plants immature (to reduce seed set).
- Expand control of these, as well as Briar Rose, to beyond the site to reduce re-colonisation.
- Treat for control of Onion Grass (with metsulfuron-methyl herbicide and an appropriate surfactant, using a wiping application method) in late winter/early spring, 6-8 weeks after emergence of growth from new corms. Treatment will be ineffective if applied too late (such as when the tips of leaves begin to show discoloration/browning from fungal infection).
- Pulse grazing with sheep in early to mid-spring to prevent seed set of annual introduced grasses.
- Ensure no grazing by sheep through summer to limit dispersal of Onion Grass seeds.

Site 4A & 4B – Condition

Predominantly Spear Grasses and Wallaby Grasses. Generally good quality with moderate inter-tussock herb diversity. Spiny Rice-flower population and individuals healthy. Very high cover of Onion Grass, and a significant amount of Ribwort, the latter especially in Site 4B, both with the potential to reduce Spiny Rice-flower health. Moderate cover of annual exotic grasses such as Wild Oat, although these were just emerging at the time of the site assessment. Eastern Grey Kangaroo tracks and scats observed as well as scats of European Rabbit, but no diggings or burrows found and no obvious signs of grazing, including of Spiny Rice-flower.

Table 7: Main native components of Campbelltown Site 4A & 4B

Common name	Scientific name
Austral Crane's-bill	*Geranium solanderi*
Black-anther Flax-lily	*Dianella revoluta*
Lemon Beauty-heads	*Calocephalus citreus*
Kangaroo Grass	*Themeda triandra*
Sheep's Burr	*Acaena × ovina*
Spear Grasses	*Austrostipa* spp.
Spiny Rice-flower	*Pimelea spinescens* subsp. *spinescens*
Wallaby Grasses	*Rytidosperma* spp.

Table 8: Main weed components of Campbelltown Site 4A & 4B

Common name	Scientific name
Large Quaking-grass	*Briza maxima*
Onion Grass	*Romulea rosea*
Ribwort	*Plantago lanceolata*
Toowoomba Canary-grass	*Phalaris aquatica*
Wild Oat	*Avena* sp.
Yorkshire Fog	*Holcus lanata*
Annual grasses	

Site 4A: Spiny Rice-flower overrun with Onion Grass.

Site 4A: Black-anther Flax-lily amongst good native grass cover, with broad-leafed herbs common. Dead stalks are controlled Toowoomba Canary-grass, with Onion Grass being the primary weed component at very high cover.

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Site 4B: Areas with lower native grass cover. Native broad-leafed herbs present (Sheep's Spur pictured) with high cover of Onion Grass and moderate cover of Ribwort. Eastern Grey Kangaroo scats evident.

Site 4A & 4B – Recommendations: 1-year adaptive management actions

- Spot spray/wipe Ribwort with a suitable broad-leaf herbicide.
- Treat for control of Onion Grass (with metsulfuron-methyl herbicide and an appropriate surfactant, using a wiping application method) in late winter/early spring, 6-8 weeks after emergence of growth from new corms. Treatment will be ineffective if applied too late (such as when the tips of leaves begin to show discoloration/browning from fungal infection).
- Pulse grazing with sheep in early to mid-spring to prevent seed set of annual introduced grasses.
- Ensure no grazing by sheep through summer to limit dispersal of Onion Grass seeds.

Eastern Grey Kangaroo

Total exclusion of Eastern Grey Kangaroo is unfeasible given the scale of the site and should not be the objective for offset sites which are intended to retain biodiversity values including fauna habitat, not just the vegetation. Establishing additional fencing beyond the site perimeters will require removal of native vegetation, for which a permit and associated offsets would be needed,

as well as justification provided for such to the satisfaction of protections under the state planning provisions. The existing fencing should be sufficient deterrent to prevent over-gazing, but this is dependent on the surrounding expanse of grassland being equally appealing. It is likely that the management actions within the site (such as the ecological burn) have created a superior food source (e.g., new growth of grasses, easily located inter-tussock herbs). Replicating management actions beyond the site will create areas of similar quality outside and reduce the motivation for herbivores to jump the fencing. This will have the added benefit of reducing surrounding weed cover and inevitable re-establishment in previously controlled sites. An alternative—or additional—option would be to have a population study done with the intent of determining if a cull is appropriate and having DEECA permit such.

I trust the above provides suitable initial guidance for remedial actions for the next year, after which time a more thorough assessment should be undertaken. Please contact me if you have any questions or comments.

Yours sincerely,

Chris Dunk

Senior Ecologist & Project Manager
Nature Advisory Pty Ltd

(03) 9815 2111 | chris@natureadvisory.com.au

December 2022

26 Monday 360/005 Week 52

Boxing Day (ex. NT, SA), Christmas Day Observance (NT, SA, WA), Boxing Day (NZL)

27 Tuesday 361/004 Week 52

Christmas Day Observance (ex. NT, WA, SA)

Boxing Day Observance (NT, SA, WA), Christmas Day Observance (NZL)

CAMPBELLTOWN — 7.30 — 1.00 pm

PROPERTY INSPECTION - OF SITES.

28 Wednesday 362/003 Week 52

January | February | March | April | May | June

December 2022 / January 2023

Thursday 29 363/002 Week 52

CAMPBELLTOWN SITE WEED CONTROL.

3 MEN.

GRAHAM

JEFF.

RAY

ST JOHNS WORT
PHALARIS
THISTLES.
ROCK.
FINISHED SITE 2. - 7.30 - 4.00 PM

PHOTOS x 6 TAKEN / 30 Site 1.

BACK PACKS - 80 LITRES + 120 LITRES + 200 LTRS

CAMPBELLTOWN.

Friday 30 364/001 Week 52

3 MEN.

GRAHAM

JEFF

RAY

ST JOHNS WORT
PHALARIS
THISTLES.
ROCK
FINISHED SITE 1 @ 10.00 am

COMMENCED SITE 3. — FINISHED @ 4.00 pm

BACK PACKS - 120 LITRES + 440 LITRES.

Saturday 31 365/000 Week 52

New Year's Day (ex. ACT, TAS, SA), New Year's Day (NZL)

Sunday 1 001/364 Week 52

July | August | September | October | November | December

January 2023

New Year's Day Observance (AUS), Day after New Year's Day (NZL)

2 Monday 002/363 Week 1

CAMPBELLTOWN - 3 MEN (JEFF/RAY/GRAHAM.

SITE 3 = REPAIR + RESTRAIN BOUNDARY FENCE ON SITE 3 - ELIMINATED UNDERGROUND ACCESS BY KANGAROOS - PHOTOS SUPPLIED.

SITE 4 = COMMENCED SPOT SPRAYING BY BACK PACKS - WEEDS = PHALARIS/ST JOHNS WORT + BANKSIA ROSE + DOCK.

New Year's Day Observance (NZL)

3 Tuesday 003/362 Week 1

CAMPBELLTOWN - 3 MEN (JEFF/RAY/SAM.

SITE 4 = CONTINUED SPOT SPRAYING OF TARGETED WEEDS. = ST JOHNS WORT.

CHEMICALS - 4 x 3/4 = 120 LITRES APPLIED.

4 Wednesday 004/361 Week 1

January 2023

Thursday 5 005/360 Week 1

Friday 6 006/359 Week 1

CAMPBELLTOWN - 2 MEN - JEFF/RAY

2 MEN.

SITE 4 - COMPLETED PHALARIS SPRAYING. COMPLETED ST JOHNS WORT COMPLETED DOCK CONTROL

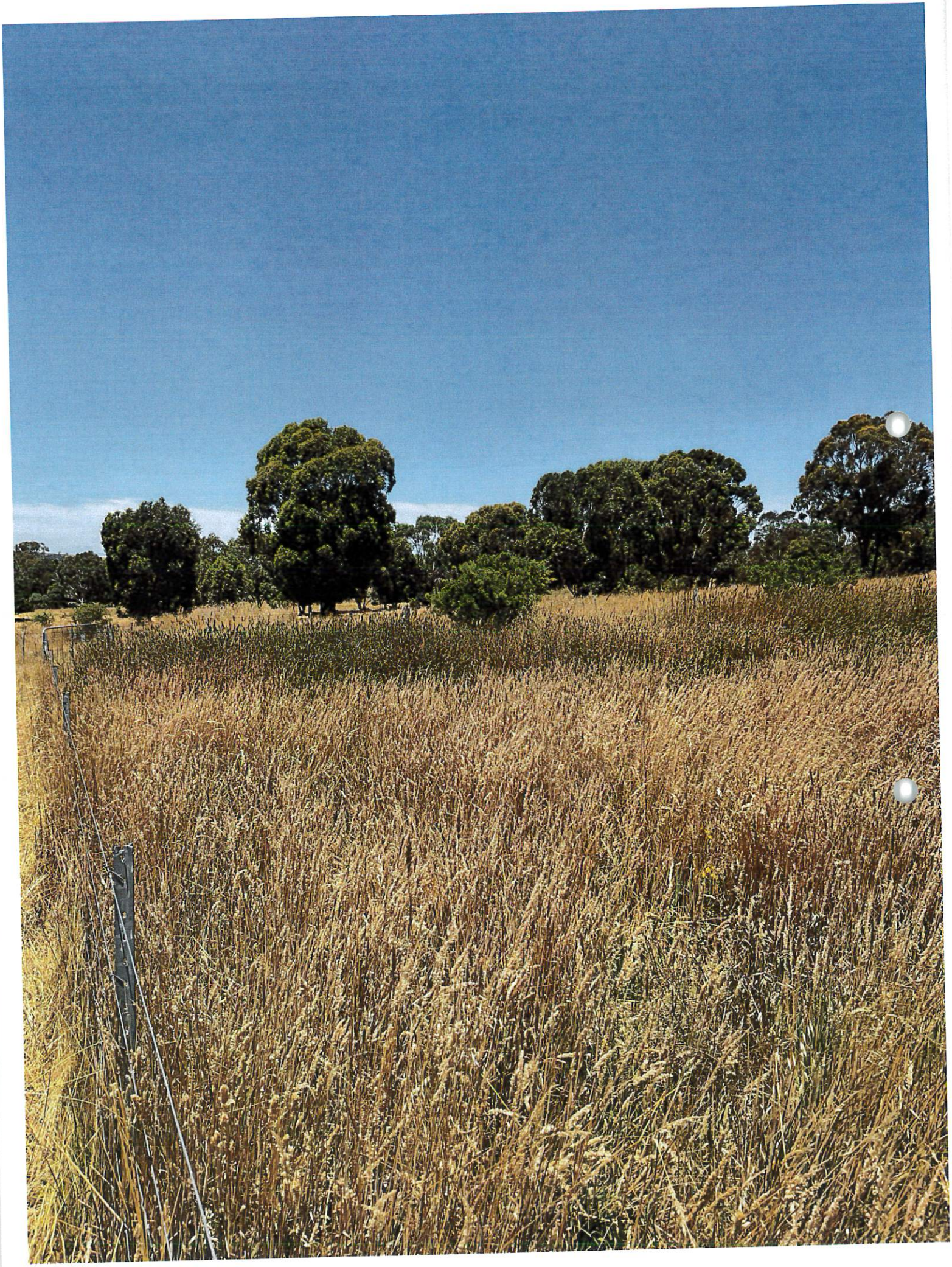
Saturday 7 007/358 Week 1

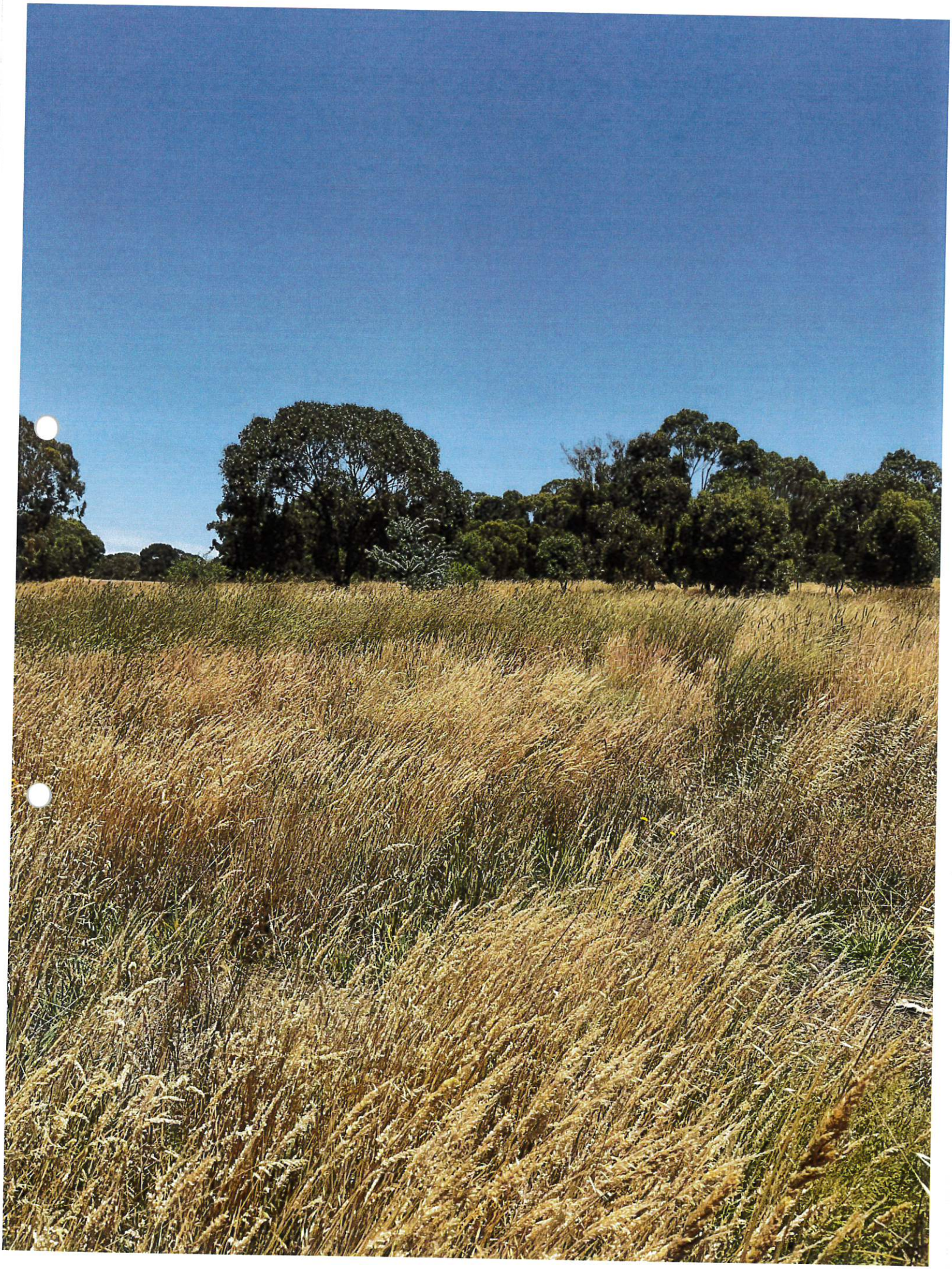
Sunday 8 008/357 Week 1

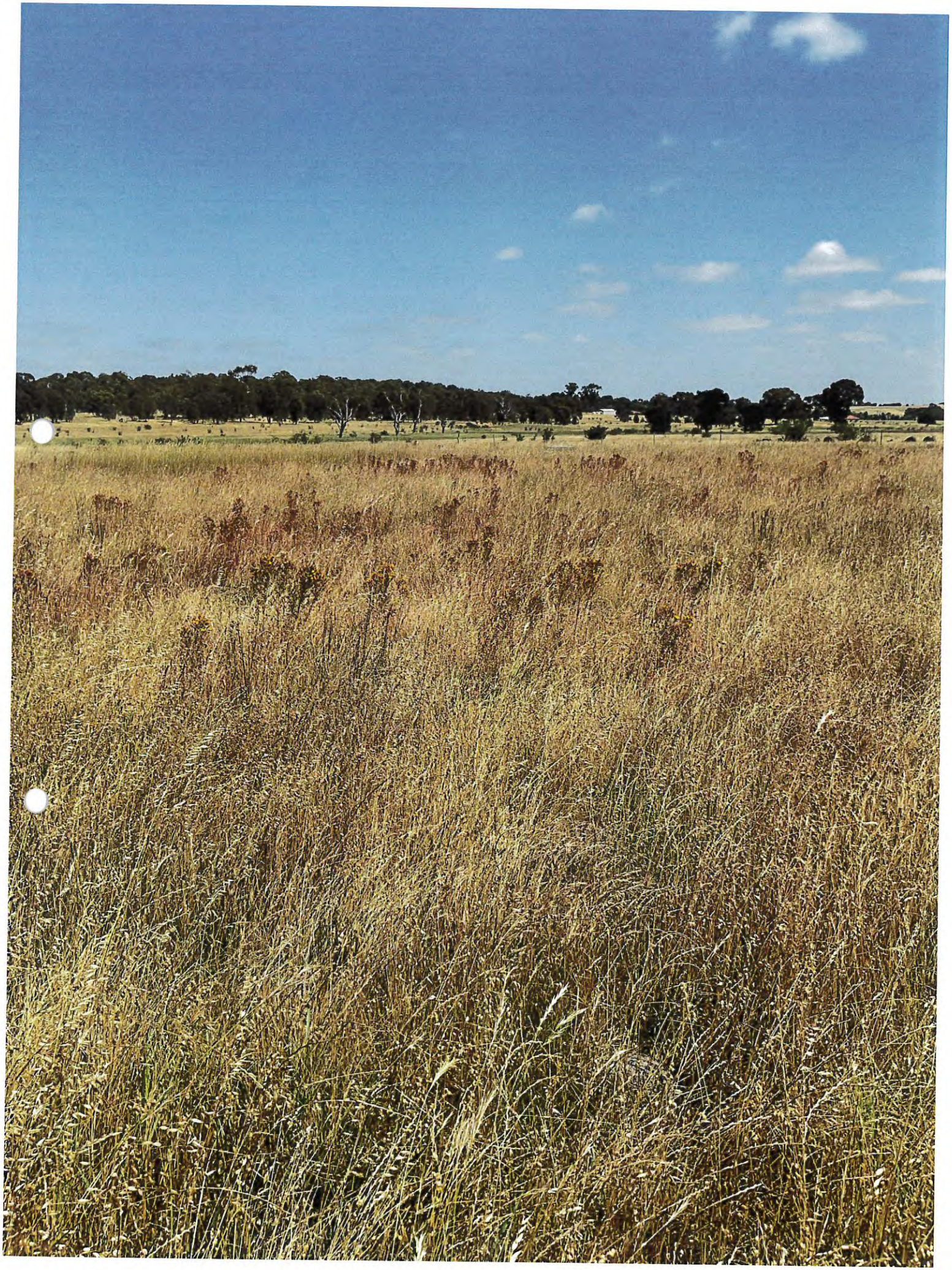
January | February | March | April | May | June

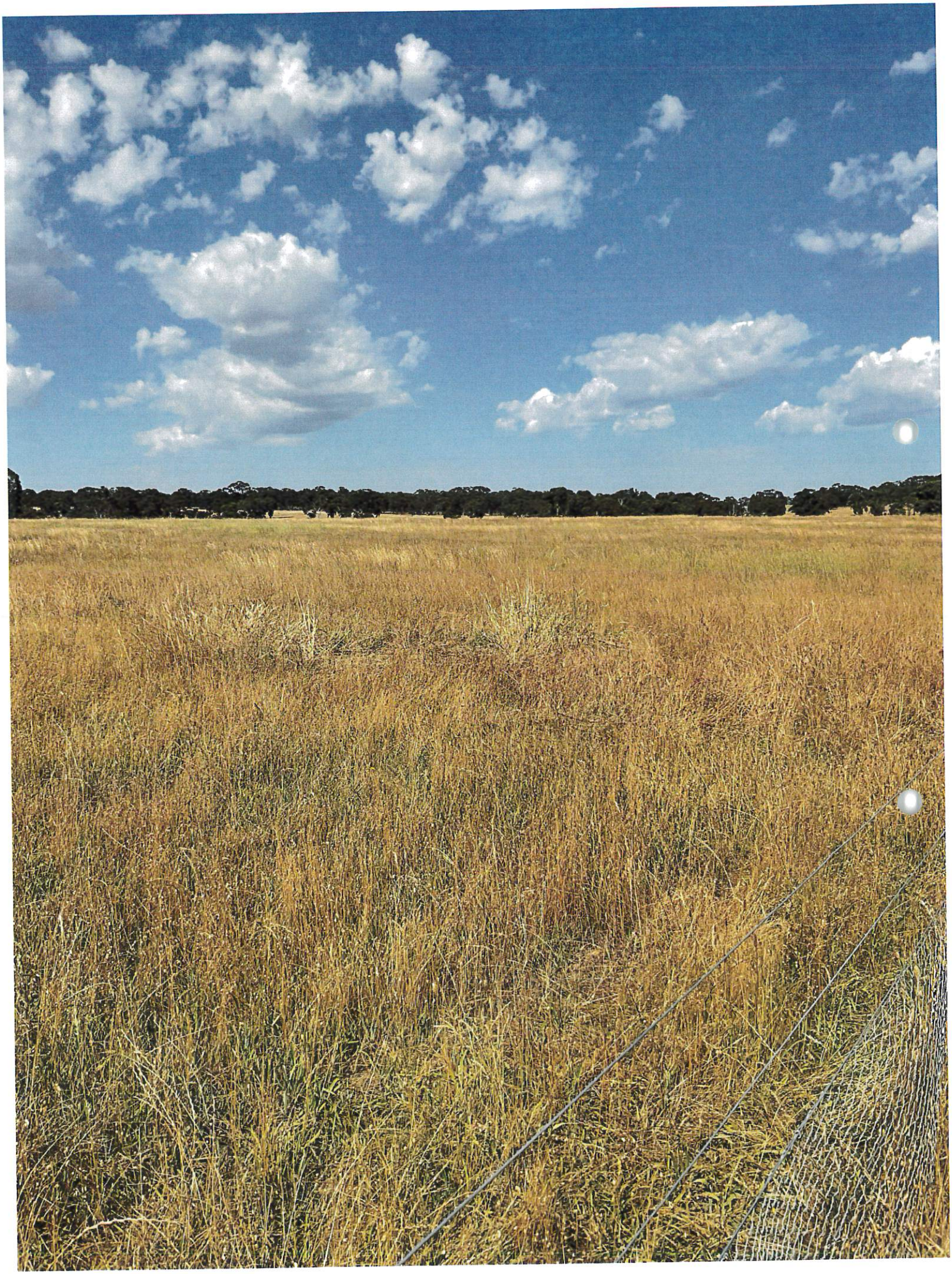
July | August | September | October | November | December


BUSHBROKER
BB-3004-01
SITE 2
DO NOT ENTER
LANDMARK
PLEASE
SHUT GATE









COLD BURN SITE 13
MAY '22

Appendix 9: Water Quality Monitoring Report (Aquatica Environmental 2023)

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ABN 83 572 211 867

Our Ref: RPT000435

16 May 2023

DFC (Project Management) Pty Ltd
Attn.: Alan Barnes
Level 1, 863 High St
Armadale VIC 3143

Via email: alan.barnes@denniscorp.com.au
CC email: cameron.lee@denniscorp.com.au; chrisd@natureadvisory.com.au; brettl@natureadvisory.com.au

Dear Alan,

REPORT: Water Quality Monitoring of Kororoit Creek for Modeina Estate Growling Grass-frog Management Plan

1. INTRODUCTION

Aquatica environmental was engaged by Dennis Family Corporation (Project Management) Pty Ltd (DFC) to undertake water quality monitoring as a requirement under conditions in the growling grass frog (*Litoria raniformis*, GGF) Management Plan (GGFMP, Nature Advisory 2017) for Modeina Estate development in Burnside, Victoria.

The monitoring was required at the four sites identified in Figure 1. The GGFMP does not stipulate what water quality parameters are required to be monitored, other than that:

> "*Testing of water quality upstream and downstream of outfalls (beyond mixing zone) to determine the influence of stormwater inputs and whether water quality meets the objectives for water quality in the catchments of Port Phillip Bay as per the SEPP (Waters of Victoria) guidelines.*" (Nature Advisory 2017))

According, Aquatica Environmental scoped the project to include and sample for water quality parameters in broad accordance with those detailed in the Victorian Department of Energy, Environment and Climate Action's (DEECA) Growling Grass Frog Habitat Design Standards (the standards, DELWP 2017). The water quality parameters included from the standards included in situ sampling for pH, salinity, turbidity, etc. and water samples collected for laboratory analysis including E-coli, ammonia, total nitrogen, total phosphorus, etc.

Note, that since 2017 the State Environmental Protection Policy (i.e. SEPP), as referenced in the GGFMP, has been replaced by the Environmental Reference Standard (ERS, EPA 2021). Accordingly, the results of the water quality sampling have been compared to the ERS objectives for the "*urban segment*".

2. METHODOLOGY

2.1. Task 1: Water quality Sampling

At each of the four water quality sampling sites the following was collected:

- Site GPS coordinates.
- Upstream and downstream facing site reference photographs.
- in situ water quality samples using a calibrated Hannah Instruments HI9829 multiparameter water quality metre for the following parameters:
  - pH;
  - Temperature;

  - Salinity / electrical conductivity;
  - Dissolved oxygen; and
  - Turbidity.
- collection of water quality samples for analysis by our preferred laboratory, ALS, for the following parameters:
  - *E coli*;
  - Ammonia;
  - Nitrate;
  - Nitrite;
  - Total Kjeldahl Nitrogen (TKN);
  - Total nitrogen; and
  - Total phosphorus.

3. RESULTS

3.1. Sampling Sites

Four sites were sampled including three in Kororoit Creek (Sites 2-4) and one in a constructed wetland (Site 5)(Figure 1).

The sampling was undertaken on the 9th May 2023. Weather conditions on the day of sampling were cold and overcast, with air temperatures ranging between approximately 12.2°C and 13 °C and with approximately 0.2 millimetres of rain falling during the sampling (BOM 2023). Approximately 15 millimetres of rain fell in the 24 hours and 37 millimetres consistently over the seven days leading up to the sampling (BOM 2023).

Site GPS coordinates, details and photographs provided in Attachment A.

Figure 1 The sampling sites (Source: Nature Advisory)

3.2. In Situ Water Quality

The results of the in situ water quality sampling are provided in Table 1. In accordance with the GGFMP the results have been compared to the ERS objectives (EPA 2021) and GGF water quality standards (DELWP 2017).

Kororoit Creek Sites 2 to 4 returned ecologically similar results, reflective of a lotic (i.e. flowing) waterway with the sites being proximal to each other. Constructed wetland Site 5 varied slightly, though still ecologically similar, reflective of a lotic (i.e. still) wetland.

All parameters at all site were within the ERS objectives and GGF water quality standards, with the exception of dissolved oxygen end turbidity at Site 5. In both cases the ERS objective was exceeded, though not to a degree that would be ecologically significant too GGF.

Overall, the in situ results are all well within the range to be expected from an urban waterway and none of the results indicate an ecologically significant threat to GGF.

Table 1 In situ water quality results

Parameter	Units	ERS Objectives (EPA 2021)	GGF Water Quality Standards (DELWP 2017)	Site 2	Site 3	Site 4	Site 5
pH	**pH units**	≥6.5*, ≤8.2**	6.0 – 8.5	7.77	7.86	7.91	7.76
Dissolved Oxygen (DO)	**%**	≥60*, <130#	-	66.4	65.5	71.2	26.4
	ppm	-	-	7.25	7.16	7.78	2.85
Salinity / Electrical Conductivity (EC)	**µS/cm**	≤3,000	<5,000	1,160	1,155	1,143	232
	ppm	-	-	580	577	572	116
	PSU	-	-	0.58	0.58	0.57	0.11
Turbidity	**NTU**	≤30	<40	17.0	14.4	16.0	31.2
Temperature	**Deg. Celsius**	-	-	11.69	11.61	11.67	12.22

* 25th percentile; ** 75th percentile; # Maximum; orange highlight = exceeds objective and/or standard

3.3. Laboratory Water Quality

The results of the laboratory water quality results are provided in Table 2 (laboratory data as Attachment B). In accordance with the GGFMP the results have been compared to the ERS objectives (EPA 2021) and GGF water quality standards (DELWP 2017).

The results were relatively consistent across the three Kororoit Creek sites (Sites 2 to 4), with slight but anticipated differences in the constructed wetland (Site 5). The GGF water quality standard for ammonia was exceeded at all four sampling sites (Table 2). Outside of the standard there is little known and a paucity of information about the chemical attributes and water quality tolerances of GGF. However, it is known that the species inhabits water bodies with a wide range of water quality values including even within untreated storm water ponds and sewage treatment lagoons (DELWP 20107).

No other parameter exceeded its relevant ERS objective or GGF water quality standard.

Overall, the laboratory water quality results are all well within the range to be expected from an urban waterway and none of the results indicate an ecologically significant threat to GGF.

Table 2 Laboratory water quality results

Parameter	Units	ERS Objectives (EPA 2021)	GGF Water Quality Standards (DELWP 2017)	Site 2	Site 3	Site 4	Site 5
E.coli	Orgs/100mL	-	<150##, <1,000^	280	160	250	41
Ammonia (NH_3)	mg/L	-	<0.010	0.049	0.031	0.026	0.15
Nitrite (NO_2)	mg/L	-	-	0.002	0.004	0.003	0.014
Nitrate (NO_3)	mg/L	-	-	0.051	0.068	0.045	0.13
Total Kjeldahl Nitrogen	mg/L	-	-	0.69	0.51	0.62	0.73
Total nitrogen	mg/L	<1.2**	<1	0.75	0.58	0.67	0.87
Total phosphorus	mg/L	<0.11**	<0.1	0.071	0.052	0.06	0.10

** 75th percentile; ## Primary contact; ^ Secondary contact; orange highlight = exceeds objective and/or standard

4. CONCLUSION AND RECOMMENDATIONS

Overall, the single round of water quality sampling found water quality in the three Kororoit Creek sites and one constructed wetland site were all within the range typically observed in urban waterways. Only minor exceedances of the ERS objectives for dissolved oxygen and turbidity were observed at Site 5 and the GGF standard for ammonia at all four sites.

None of the results, or exceedance, indicate an ecologically significant threat to GGF.

Should further rounds of water quality sampling be required the following recommendations are made:

- Ensure that the methodology described in this report is adhered to allow temporal comparison (i.e. changes over time).
- Ensure the same sampling locations used.
- Consider undertaking the sampling at different times of year particularly during GGF breeding in order to understand the water quality parameters during that key period (i.e. sampling could be undertaken during annual GGF surveys).

If you have any questions or would like to discuss this report or any other matter further, please do not hesitate to call me on 0413 935 497. We look forward to the opportunity of continuing to work with DFC and NA on this project.

Kind Regards,

Aaron Jenkin
Director and Principal Scientist Aquatic Ecology
Aquatica Environmental

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5. REFERENCES

BOM (2023). Bureau of meteorology. Weather observations for Essendon airport. Available online at: http://www.bom.gov.au/products/IDV60901/IDV60901.95866.shtml

DELWP (2017). Growling Grass Frog Habitat Design Standards Melbourne Strategic Assessment. The State of Victoria Department of Environment, Land, Water and Planning. Available online at: https://www.msa.vic.gov.au/__data/assets/pdf_file/0019/73414/Growling-Grass-Frog-Habitat-Design-Standards_March2017.pdf

EPA (2021). Publication 604.2: Guideline for Environmental Management (GEM). Rapid Bioassessment Methodology for Rivers and Streams. Environmental Protection Authority Victoria, Southbank.

Nature Advisory (2017). Modeina Estate – Precinct 2 Growling Grass Frog Management Plan. Report No. 7045 (29.7) prepared for Denis Family Corporation. Dated September 2017.

Attachment A - Sampling Sites

Site 2

37°44’19.8”, 144°45’15.8”


Site 3

37°44’13.0”, 144°45’41.5”


Site 4

37°44’42.0”, 144°45’33.6”

Site 5

37°44’48.3”, 144°45’28.7”

ATTACHMENT B – Laboratory Data

CERTIFICATE OF ANALYSIS

Batch No: **23-30528**
Final Report **90987**

Client: **Aquatica Environmental**
Contact: **Mr. Aaron Jenkin**
Address: 220 Old Eltham Road
LOWER PLENTY
VIC
3093

Laboratory Scoresby Laboratory
Address Caribbean Business Park,
22 Dalmore Drive,
Scoresby,
VIC 3179
Phone 03 8756 8000
Fax 03 9763 1862
Contact: Linna Truong
Client Manager
Linna.Truong@alsglobal.com

PO No: **000435**
Sampler Name: **Aaron Jenkin**
ALS Program Ref: **AQUATICA**
Program Description: **Analysis for Aquatica Environmental**
Client Ref: **Moderna Estate GGF**

Date Sampled: **09-May-2023**
Date Samples Received: **09-May-2023**
Date Issued: **16-May-2023**

The hash (#) below indicates methods not covered by NATA accreditation in the performance of this service .

Analysis	*Method*	*Laboratory*	*Analysis*	*Method*	*Laboratory*
Colilert (2000)	MM514	Scoresby	NH3 as N (LL)	WK055SA	Scoresby
NO2 as N (FIA)	WK057A	Scoresby	NO3 as N (FIA)	WK058A	Scoresby
TKN (Calc)	WK261PA	Scoresby	TN/TP (LL)	WK262PA & WK267 PA	Scoresby

Signatories

Name	*Title*	*Name*	*Title*
Chatura Perera	**Team Leader Nutrients**	**Hoa Nguyen**	**Analyst**
Simone Rhodes	**Analyst**		

Samples not collected by ALS and are tested as received.
Calculated results are based on raw data.

Samples are tested within holding time unless otherwise stated.

Batch No: **23-30528**
Report Number: **90987**
Client: **Aquatica Environmental**
ALS Program Ref: **AQUATICA**
Program Description: **Analysis for Aquatica Environmental**

Sample No	Site Code	Site Description	Sample Type	Sampled Date/Time
8580335	NONE	MOD2	WATER	09/05/23
8580336	NONE	MOD3	WATER	09/05/23
8580337	NONE	MOD4	WATER	09/05/23

Analysis - Analyte	*Sample No. Site Code Units*	8580335 NONE	8580336 NONE	8580337 NONE
NO3 as N (FIA) - Nitrate, as N	mg N / L	0.051	0.068	0.045
NO2 as N (FIA) - Nitrite, as N	mg N / L	0.002	0.004	0.003
NH3 as N (LL) - Ammonia, as N	mg N / L	0.049	0.031	0.026
TN/TP (LL) - Total Nitrogen, as N	mg N / L	0.75	0.58	0.67
TN/TP (LL) - Phosphorus, total as P	mg P / L	0.071	0.052	0.060
TKN (Calc) - TKN (via Calculation)	mg/L	0.69	0.51	0.62
Colilert (2000) - E.coli	MPN/100mL	280	160	250

Sample No	Site Code	Site Description	Sample Type	Sampled Date/Time
8580338	NONE	MOD5	WATER	09/05/23

Analysis - Analyte	*Sample No. Site Code Units*	8580338 NONE
NO3 as N (FIA) - Nitrate, as N	mg N / L	0.13
NO2 as N (FIA) - Nitrite, as N	mg N / L	0.014
NH3 as N (LL) - Ammonia, as N	mg N / L	0.15
TN/TP (LL) - Total Nitrogen, as N	mg N / L	0.87
TN/TP (LL) - Phosphorus, total as P	mg P / L	0.10
TKN (Calc) - TKN (via Calculation)	mg/L	0.73
Colilert (2000) - E.coli	MPN/100mL	41

A blank space indicates no test performed.