La Trobe University Offset Site
Ecological Monitoring and Compliance Report for 2021

FINAL REPORT

Prepared for La Trobe University

15 September 2022

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- La Trobe University: Antony Inglis
- Department of Environment, Land, Water and Planning for access to the Victorian Biodiversity Atlas and Native Vegetation Information Tools
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Biosis staff involved in this project were:

- Emily Newling (assistance in the field)
- Lucy Wilson (mapping)
- Sjaan Bidwell (quality assurance)

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Summary

Biosis was commissioned by La Trobe University to undertake annual monitoring of the La Trobe University offset site. The offset site, covering approximately 2.81 hectares, is located in the south western corner of the campus, just west of the western end of Sports Field Lake on a portion of land otherwise known as 906 Plenty Road Bundoora, 3083. The offset area is located within the university campus on land owned and controlled by La Trobe University. The northern half of the offset area has been the subject of a targeted survey for Matted Flax-lily (MFL) *Dianella amoena* and is known to support one individual in similar vegetation to that proposed to be impacted by the Stage 3 Sports Park development (Biosis 2019)..

The 2.81 hectare offset area meets the quantity and quality requirements for an offset for the removal of 23 MFL associated with the proposed Stage 3 Sports Park development as determined by *Department of Climate Change, Energy, the Environment and Water* (DCCEEW) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) in association with the approval conditions for referral EPBC 2018/8343.

The Offset Management Plan (Biosis 2020) specifies a range of management actions for the offset area, including weed management, revegetation works and ecological burning and protection of the habitat values from degradation by development and unauthorised access.

The current report provides an assessment of the baseline (year 1) monitoring results against the targets set out in the endorsed Offset Management Plan (OMP). This report also acts as the year 1 audit of management actions specified in the OMP.

1. Introduction

1.1 Background

Biosis was commissioned by La Trobe University (La Trobe) to undertake baseline ecological monitoring at the La Trobe offset site in accordance with the approved Offset Management Plan (OMP) (Biosis 2020). The offset site (study area) is located in the south western corner of the campus, just west of the western end of Sports Field Lake (Figure 1).

The development of the La Trobe University Sports Precinct Stage 3 will result in clearing of 3.203 hectares of native vegetation. This impact will also result in the loss of 23 individuals of Matted Flax-lily *Dianella amoena* within 1.26 hectares of suitable habitat.

The 2.81 hectare offset area meets the quantity and quality requirements for an offset of MFL habitat as determined by DCCEEW under the EPBC Act in association with the approval conditions for referral EPBC 2018/8343 for the La Trobe University Sports Precinct Stage 3. The offset site is known to provide habitat for the EPBC Act Listed species MFL and one individual was recorded within the study area (Biosis 2019).

Management of the EPBC Act offset will involve protection and active ecological management of 2.81 hectares of vegetation, which is potential MFL habitat and supports remnants of Plains Grassy Woodland (EVC 55) and a known individual of MFL.

1.2 Purpose

This report details the findings of the baseline ecological monitoring undertaken in October 2021 in accordance with the OMP (Biosis 2020), with a focus on vegetation management. Where action is required to meet management targets, recommendations are provided.

The report documents:

- Management measures commenced and completed during the reporting period.
- Changes in management measures and rationale for changes.
- Detailed description of the baseline monitoring program.
- Results and analysis of baseline monitoring data.
- Discussion of baseline ecological monitoring results.
- Recommendations for management and/or additional monitoring.

1.3 Relationship to other documents

This monitoring report is to be read in conjunction with the following documents:

- The endorsed OMP (Biosis 2020), which identifies the targets to manage the offset site.
- Vegetation condition assessment and offset suitability (Biosis 2019) that details the biodiversity values of the study area.

1.4 The offset area

The offset area (approximately 2.81 hectares) is located in the south western corner of the campus, just west of the western end of Sports Field Lake on a portion of land otherwise known as 906 Plenty Road Bundoora 3083 (Figure 1). The property is currently zoned as Public Use Zone 2 (PUZ2) and is partly covered by an Environmental Significance Overlay (ESO2).

This land parcel includes broader areas dominated by degraded Plains Grassy Woodland (EVC 55) in relatively uniform, poor, condition. Other parts of this parcel of land (outside of the offset area) have been cleared for the development of a variety of sporting fields and other infrastructure. The entire offset area has been designated as suitable MFL habit based on presence of the original topsoil and containing some native vegetation in the ground layer, even in areas dominated by weeds, where MFL have been shown to persist. The offset area includes four habitat zones and other areas dominated by introduced species, all of which will be managed to provide the MFL offsets for development of the Stage 3 Sporting Precinct (Referral 2018/8343).

The study area is within the:

- Victorian Volcanic Plain Bioregion
- Management area of the Port Phillip and Westernport Catchment Management Authority (CMA)
- City of Darebin

1.4.1 Landscape context

The offset area is within the La Trobe University Bundoora campus and is in close proximity to residential housing, university buildings and other facilities. More broadly, the campus has important wildlife values based on the La Trobe Wildlife Sanctuary. The surrounding area (including the offset area) is known habitat for MFL with an area immediately south of the proposed offset area managed by the City of Banyule and a natural remnant supporting MFL.

Additionally, Darebin Creek is approximately 30 meters from the western boundary of the offset, flowing south. The creek is an important habitat feature in north-east Melbourne forming a wildlife corridor within the suburbs, connecting with the larger Yarra River corridor. Native vegetation throughout the campus provides connectivity to the Darebin Creek corridor

1.4.2 Significant species and ecological communities

Flora and fauna species recorded from the study area are detailed in Appendix 1 of the OMP and Appendix 1 of this monitoring report.

Significant ecological values (Biosis 2019) include:

- 1.28 ha of native vegetation
- Vegetation classified as the ecological vegetation class (EVC) Plains Grassy Woodland (EVC 55) which has a bioregional conservation status of Endangered.

- Habitat for EPBC Act Listed Matted Flax-lily, including 1 recorded individual

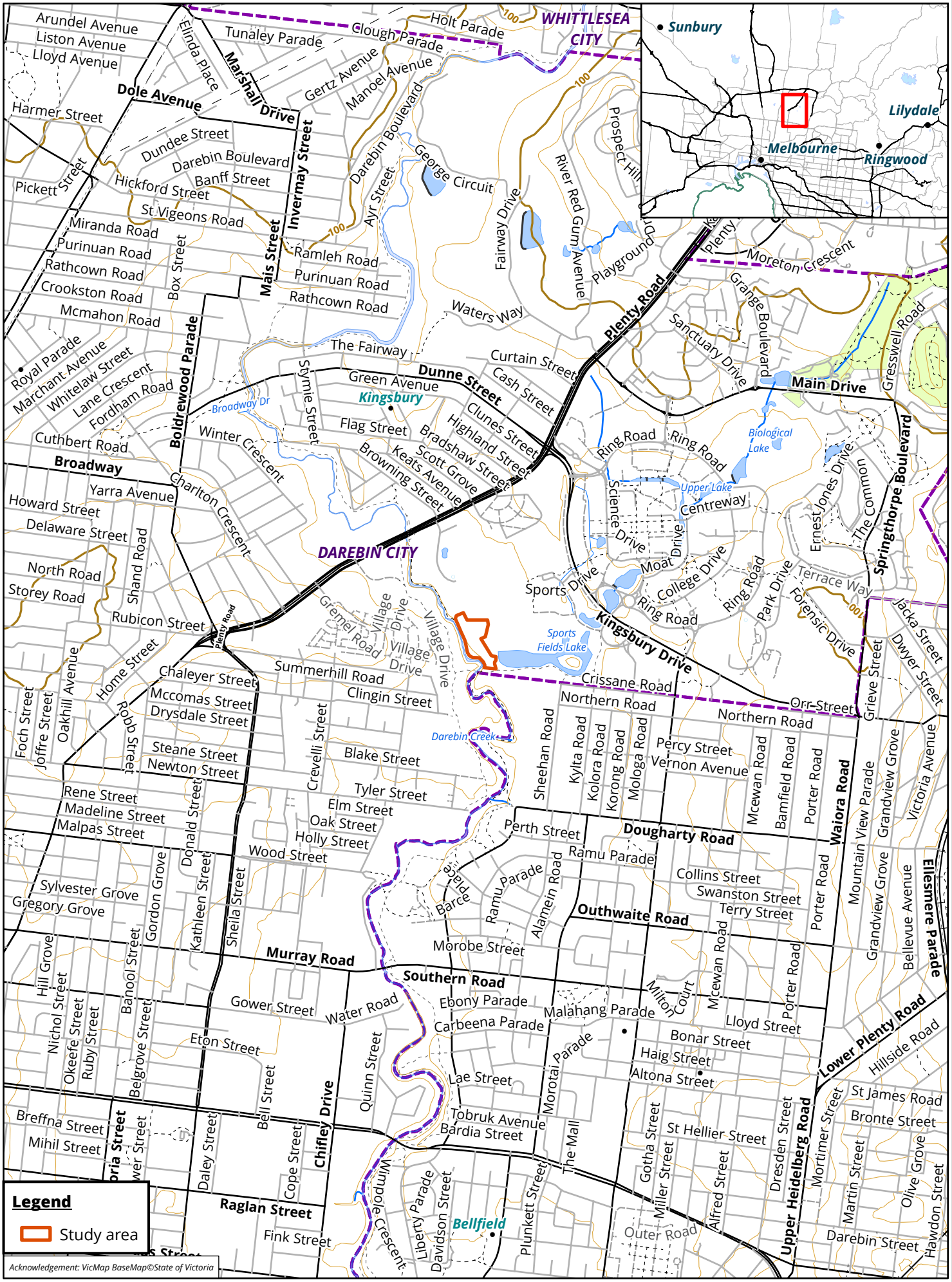


Figure 1 Location of the study area

biosis

Matter: 34751,
Date: 17 August 2022 ,
Prepared for: SH, Prepared by: SKM, Last edited by: smitchell
Layout: 34751_F1_Location
Project: P:\34700s\34751\Mapping\34751_LaTrobe_Stage3_OffsetMFLmonitoring.aprx

0 250 500 750 1,000
Metres
Scale: 1:25,000 @ A4
Coordinate System GDA 1994 MGA Zone 55

N

00

2. Compliance and reporting requirements

2.1 Responsibilities of La Trobe University

La Trobe University is responsible for the implementation of the OMP and the management of the offset area in perpetuity via a covenant. Management responsibilities are detailed in the OMP and include:

1. Implementing the OMP.
2. Ensuring all staff and contractors comply with all OMP requirements.
3. Ensuring preparation of ongoing management audit/review.
4. Ensuring preparation of annual management objectives for the next year including targets and standards.
5. Appointing of consultant ecologist and specialist bushland management contractor to implement management of the site.
6. Reporting to TfN and DCCEEW as required.

These tasks will be undertaken by dates specified in the OMP. La Trobe compliance with their responsibilities under the OMP are addressed in 3.2 of this report.

The works program will be audited at the end of year 1, year 4, year 8, year 10 and year 18. An annual report will be prepared that documents the works completed and an assessment against targets that have been established. This report marks the first audit report.

2.2 Responsibilities of all staff or contractors on site

All staff or contractors must:

- Work according to the OMP.
- Report any issues or incidents to the Project manager.

For the current reporting year (2021), all staff and contractors worked according to the OMP and reported any issues or incidents to the Project Manager.

2.3 Environmental approvals

Vegetation removal associated with the construction of the La Trobe University Sports Precinct Stage 3 has been authorised under the EPBC Act approval for EPBC 2018/8343. Vegetation proposed for removal is described in the biodiversity assessment prepared by Biosis (2019).

2.4 Enforcement

Compliance with the approved EMP is mandatory under the EPBC act approval and will be subject to enforcement by DCCEEW.

2.5 Reporting

Unless otherwise advised by the Minister, the landowner, via the approval holder (LTU), must submit a report annually to TfN and DCCEEW for the period of the approval (i.e. until 2040). Reports are to be submitted at least two months prior to the anniversary date of the execution of the OMP to allow time for compliance to be assessed before the anniversary date. Reports will also be published on the LTU website within 3 months of every 12 month anniversary.

The Annual Report will address progress against the commitments set out in this OMP. Annual Reports will provide enough detail in the form of written comments and supporting evidence that an assessor can easily determine the completion of/progress against the management commitments and completion criteria for the offset site.

The annual report will include:

- Details of management actions, including on ground works, undertaken within the reporting period.
- Results of monitoring activities, including fence condition, weeds, pest animals, habitat quality, vegetation quality and ground cover biomass accumulation / the cover of open ground.
- Tracking of results in comparison to management performance targets and completion criteria.
- Site photographs including from five defined photo points.
- Details of compliance or non-compliance with the schedule of management actions (Table 1).
- Details of compliance or non-compliance with performance targets (Section 3.2).
- Details of any incidents or new and emerging management issues, with recommendations for corrective action and plan review in order to obtain the offset completion criteria.
- Any triggers exceeded and which corrective actions were implemented.
- Results of MFL monitoring events.

2.6 Data management

The qualified ecologist undertaking ecological components of the monitoring program will retain all monitoring data in an appropriate database format. Spatial data will be maintained within an appropriate GIS file format (e.g. ESRI shape file). All flora and fauna records will be submitted to DCCEEW as per the requirements of relevant licenses.

La Trobe will ensure all records of inductions, inspections and monitoring are stored safely and are readily accessible for auditing. Types of records relevant to this plan include:

- All monitoring, inspection and compliance reports
- Induction and training records
- Correspondence with public authorities
- Reports on incidents impacting on biodiversity values and follow-up action
- Spatial data.

3. Monitoring compliance with management actions 2021

3.1 Approach to monitoring

Biosis monitored completion of management during year 1 (2021/22). The annual compliance monitoring included:

- Undertaking a site inspection at the end of year 1 to record whether actions had been completed satisfactorily e.g. erection of fencing and signage.
- Checking other evidence of completion of management actions.

3.2 Management actions completed (2021/22)

Table 1 lists the management actions specified in the approved OMP for the current reporting period (2021/22). The table indicates whether the action was completed, is currently in progress or not yet commenced. Some actions are considered ongoing, in which case compliance for 2021 was reported. Table 1 also indicates whether the management is considered compliant (shaded green), partially compliant (shaded orange) or non-compliant (shaded red). Where non-compliance was reported, recommendations are provided to ensure compliance going forward.

Notably, all of the relevant actions specified for this period were completed or are ongoing in accordance with the OMP in 2021/22. In summary, La Trobe University has satisfactorily complied with the OMP during the 2021/2022 reporting year.

Table 1 Prograss against management targets for the offset site as outlined in the OMP

Management item	Year 1 targets	Progress at end of Year 1
Long-term protection	The offset area will be secured in-perpetuity via a covenant as to part Section 3A Victorian Conservation Trust Act 1972, to be registered on the title prior to the commencement of development associated with the Stage 3 Sporting Precinct	Partially compliant - covenant with TfN is in the process of being finalised
Annual works program	Prior to any works being undertaken each year an annual works program will be developed by an experienced bushland regenerator	Compliant; Annual works program prepared by Darebin Creek Management Committee
Fencing, information and access control	Establish fencing and or other access control devices (i.e. gates) to control access to the offset site and repair promptly if damage occurs	Compliant; Fencing and access control has been established

	Establish posts to mark the boundary of the offset site for management and monitoring purposes under supervision from a qualified ecologist	Compliant; Post to mark the boundary of the offset area have been established
	Control access and any passive use to minimise impacts on native vegetation	Compliant; Area is fenced and gates are locked
	Provide access for management vehicles into the offset site, using the existing track network. No additional vehicle access is to be established	Compliant; No new tracks have been established within the offset area. The existing track network is used for vehicle access
	Surveys of the offset boundary and any associated access control infrastructure will be conducted quarterly, and when visiting the site to conduct other monitoring or management actions	Compliant; Fencing was in good condition during the compliance monitoring
Weed control	Treat all existing infestations of woody weeds within 12 months, and eradicate within three years. Continuous follow-up control to eradicate woody weed seedlings and other regeneration	Compliant (ongoing); The land management team commenced woody weed removal in February 2021 and have attended the site on a number of occasions through 2021 and 2022. Evidence of weed removal and spraying was recorded during site visits for compliance monitoring
	Spot spraying of weeds with appropriate herbicide will be undertaken, particularly through spring and early summer	Complaint; As above
	Target weeds will be treated before seed set; this requires repeated monitoring and treatment during the growing season	Ongoing; weeds are still present, however management is underway
	Ensure the absence of high threat woody weeds within the offset area through monitoring and where found to occur, control and eliminate promptly. Preferably control nearby infestations to prevent the spread of these species	Ongoing; weeds are still present, however management is underway

	Control works will ensure that the total cover of perennial weeds will be reduced to no more than 2% and preferably eliminated. Specific targets include: a reduction of high threat weeds in accordance with Table 4; perennial grassy weeds will be reduced to less than 1% total cover; and broadleaf weeds reduced to no more than 2% cover	Ongoing; weeds are still present, however management is underway
	Monitoring will be undertaken to demonstrate the effectiveness of weed control works and the results are to be used to adapt future control works and targets	Ongoing; year 1 monitoring complete
	Any populations of new and emerging high threat weeds will be treated promptly and eliminated. This will be done in consultation with TfN	Ongoing; Land management have undertaken weed removal on a number of occasions during the first year of management
	Any other significant environmental weeds identified during the ongoing site monitoring will also be controlled in consultation with TfN	Ongoing; As above
	During weed control, natural regeneration of indigenous flora will be protected from off-target damage	Ongoing; No evidence of damage to indigenous flora was observed during the site inspection or monitoring events
Weed monitoring	Weed monitoring conducted annually in Spring as part of the annual monitoring event	Compliant; results of weed monitoring included in this report
Pest animals	Control and seek to locally eliminate European Hares, European Rabbits, cats and foxes and using appropriate control techniques including poison baits or similar methods, without significant soil disturbance (i.e. ripping of warrens is not acceptable)	Outfoxed Pest Control undertook a survey of the offset site and detected hares and rabbits. After completion of the vermin proof fence around the offset site a shooting program took place on the evening of July 5 2022. The eradication of pest species was confirmed.
	Fumigate rabbit warrens within three weeks of detection. Fumigation works will be conducted by a suitably qualified operator	No active rabbit warrens have been noted within the offset site

Pest animal monitoring	Pest animal monitoring will occur annually in November. This will include a systematic survey of the offset site lasting no longer than thirty minutes	Outfoxed Pest Control undertook a survey of the offset site and detected hares and rabbits. After completion of the vermin proof fence around the offset site a shooting program took place on the evening of July 5 2022. The eradication of pest species was confirmed.
Biomass/ organic litter	Engage a qualified contractor to produce a fire management plan which allows for an ecological burning regime described in the following dot points:	Partially compliant; A small burn was conducted early 2022 for an area in the middle of the offset site. An ecological burn was planned for the remainder of the site however was cancelled due to site and weather conditions. A burn is planned for the remainder of the site in 2022/2023
	Undertake ecological burning over the offset area (or parts there-of) so that no area is burnt more frequently than every two years;	
	When planning burns, liaise with any relevant regulator regarding appropriate planning and permits in a timely manner;	
	Plan and conduct ecological burning within different seasons to promote regeneration of a variety of species and remove debris created by the control of woody weeds	
Understorey diversity and recruitment	Active weed management to be undertaken as outlined in Section 3.8.2 of the OMP	The land management team have visited site on a several occasions and undertaken weed management. I.e. Spraying and woody weed removal
	Biomass will be managed to enhance recruitment – see Sections 3.8.4 above	Partially compliant (ongoing); Biomass control us underway. A burn is planned for the offset site in 2022/2023
Revegetation	Once weed and biomass control activities have established areas with a low cover of weeds, these areas will be sown with a variety of suitable native graminoids (Appendix 1). This direct seeding will target a minimum establishment density of five grasses per square meter.	Not applicable - This action cannot occur until several years of weed and biomass control has occurred

Baseline site condition monitoring	Within three months approval of the OMP and prior to the commencement of any management activities a suitably experienced botanist will systematically survey the site and collect information on flora species by the establishment of five permanent five by five meter monitoring quadrats	Compliant; Baseline monitoring of the offset site was undertaken on 21 October 2021
Continuous monitoring	Regular site inspections (of about two hours at least every 2 months) to provide general condition observations. The Landowner must keep a diary of any works conducted within the offset site and record any observations which could influence or initiate a management response	Compliant; land management group keeps records of daily works and general condition observations
Woodland monitoring	The condition of the Plains Grassy Woodland will be assessed annually during spring. This will be done using the offset site as a single unit and using the habitat hectare method	Not applicable - habitat hectare assessment will be undertaken during Year 2of monitoring
Matted Flax-lily monitoring	Surveys of translocated Matted Flax-lily individuals to occur annually during late spring to early summer	Not applicable - Translocation of Matted Flax-lily individuals has not yet occurred
Revegetation monitoring	Monitoring of the revegetation works will commence in the spring on Year 3	Not applicable - monitoring to begin in Year 3
Reporting	LTU must submit a report annually to TfN and DCCEEW for the period of the approval (i.e. until 2040). Reports are to be submitted at least two months prior to the anniversary date of the execution of the OMP. The annual report will address progress against commitments set out in the OMP.	Complaint once this report is submitted to TfN and DCCEEW

4. Key offset outcomes and Monitoring of vegetation

4.1 Key offset outcomes

The key environmental outcomes / criteria to be achieved through protection and management of the offset area are:

- Permanent legal protection of 2.81 hectares of MFL habitat.
- Physical protection of the habitat area from manageable threats including grazing by domestic stock, weed infestations and degradation by pest animals.
- Attainment of MFL habitat condition completion criteria (below), as measured by habitat monitoring.

4.1.1 Future site condition – completion criteria

The 2.81 hectare offset site must achieve the following site condition:

- Be dominated by good quality native vegetation (target VQA site condition score of 30 - 45/75).
- Support a population of MFL with a density of at least 2 to 5 plants per hectare.

4.2 Methods

The flora assessment was undertaken on 21 October 2021. Five permanent 5 x 5 meter monitoring quadrats were established within the offset area. Plots were selected based on topographic variation present (floodplain, rocky slope and elevated plain) and the variation in site conditions (across a spectrum of weed dominated to patch vegetation). Figure 3 provides the location of quadrats. A star picket was placed in the north-west corner of each quadrat so the quadrats could easily be found in future monitoring rounds.

4.2.1 Photo points

Photo points were established at each quadrat and photos are to be taken annually. Four photos were taken facing into the quadrat from each corner. Using the program 'Open Camera', photos were digitally labelled with the quadrat number and orientation (e.g. Q1 NW to denote the north-west corner of quadrat 1). The photo was taken standing approximately 1.5 meters back from each corner of the quadrat. See Appendix 2 for photos.

4.2.2 Vegetation monitoring

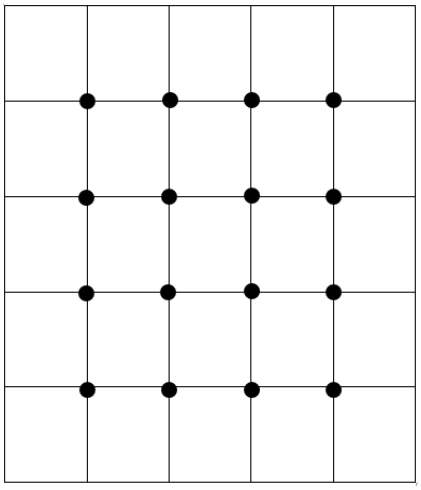
A 0.5 meter x 0.5 meter quadrat was used to define the area of assessment with a single peg placed in the south – east corner. At each quadrat the following attributes were recorded:

- Flora species, noting whether the species is native or introduced and/or a high threat weed.
- Total percent cover of each species (using Braun-Blanquet cover abundance scale, noting+ denotes < or =3 individuals, and type of cover (ie. Shrub, herb, grass etc.)
- Overall native vegetation cover (%)
- Overall cover of introduced weeds (%)
- Cover of bare ground, leaf litter, soil crust, bryophytes and inter-tussock space

4.2.3 Vegetation height

A measuring stick was placed vertically at one meter intervals inside the quadrat 16 times (Figure 2). At each interval the height of the tallest vegetation touching the stick was recorded.

Figure 2 Vegetation height at one meter intervals



4.2.4 Biomass assessment

Four sub-samples were recorded to determine relative openness of the understory at each of the five quadrats. Using the golf ball method (Morgan 2015) to measure how open or dense the understory vegetation is a 1 x 1 meter quadrat was placed at each corner of the 5 x 5 meter quadrat. Eighteen golf balls were randomly dropped into the 1 x 1 meter quadrat from a height of 1.3 meters. The visibility of the golf balls from a standing position above the quadrat was scored as follows:

- Any golf ball that was more than 90% visible was given a score of 1.
- Any golf ball that was 33% to 90% visible was given a score of 0.5.
- Any golf ball that was less than 33% visible was given a score of 0 (zero).

Each 1 x 1 meter quadrat was given a total score out of 18. Average golf ball scores for a given 5 x 5 meter quadrat can be categorised as follows (Morgan 2015):

- High biomass (0-5): low golf ball visibility, which suggests that biomass reduction (e.g. through fire and/or grazing) is required.
- Moderate biomass (6-14): moderate golf ball visibility, which suggests that the need for biomass reduction should continue to be closely monitored.
- Low biomass (15-18): high golf ball visibility, which suggests that biomass reduction is not required.

4.3 General site inspection and walkover

During the offset suitability assessment in September 2019, a preliminary flora species list was collected for the offset site. The flora species list was updated in October 2021 with new species observations.

While the current species list is relatively comprehensive, it is not exhaustive. Some species may not have been observed due to their very low abundance, dormancy or seasonal conditions. Though the timing of the October 2021 monitoring captured the peak flowering period for many species, some species had recently

finished flowering while other species (particularly Wallaby Grasses and Spear Grasses) were not yet flowering, making it difficult to identify some specimens to species level. It is expected that more species will be added to the list in the coming years.

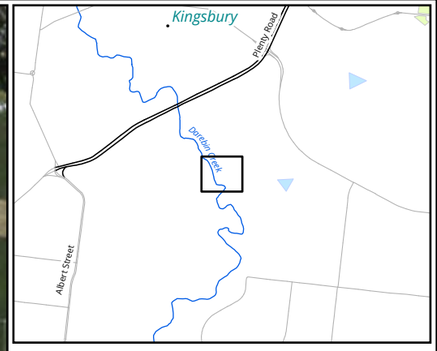
During the site visits for baseline monitoring, relevant management issues were noted and, where appropriate, their locations were mapped using a GPS-enabled tablet, typically to an accuracy of 3 meters. Where relevant, the location of woody weeds, new and emerging weeds or evidence of pest animals was mapped.

4.4 Data management

A project database was established and will be maintained allowing for data storage and protection, data extraction, quality control, analysis, interpretation, reporting and presentation.

4.5 Future monitoring

Future annual ecological monitoring must follow the methods outlined in the OMP, whilst incorporating the specific methods outlined above.



Legend

- Offset area
- Quadrat

Figure 3 Location of quadrats

0 10 20 30 40 50

Metres

Scale: 1:1,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

N

biosis

Matter: 34751,
Date: 17 August 2022 ,
Prepared for: SH, Prepared by: SKM, Last edited by: smitchell
Layout: 34751_F3_Quadrats
Project: P:\34700s\34751\Mapping\
34751_LaTrobe_Stage3_OffsetMFLmonitoring.aprx

Acknowledgements: VicMap BaseMap©State of Victoria

5. Results of vegetation monitoring

Table 2 presents a summary of targets as outlined in the OMP and the status of these targets during the Year 1 monitoring event of the offset site.

Table 2 Summary of targets and current status at the end of Year 1 monitoring

Item	Target	Outcome at end of Year 1
Weeds	Eliminate woody weeds	Woody woods recorded within offset area during year 1
	Reduce cover of perennial, introduced pasture grasses to 50% of baseline cover	Cover of perennial grasses within quadrats ranged from 22 % to 95% cover, with an average cover of 62% across quadrats
	Overall weed cover target across the entire site to reduce from 50% cover to 20% cover	Weed cover remains >20% across the entire site during the year 1 monitoring
	Cover of perennial grassy and broad-leaf weeds to no more than 2% cover across the site	Cover of perennial grassy and broad-leaf weeds >2% across the site
Revegetation	Areas not identified as having 25% cover of native vegetation will need extensive revegetation works to meet this target	Large areas still remain <25% of native vegetation
Vegetation quality	Offset site to be dominated by good quality native vegetation (VQA site condition score of 30 - 45/75)	VQA scores within the 5 quadrats range between 2-12, while VQA scores within the identified habitat zones within the offset area range between 17-22
MFLs	Support a population of MFL with a density of at least 2 to 5 plants per hectare.	NA - translocation of MFLs not yet occurred

5.1.1 Flora species

A total of 68 flora species were recorded during the baseline monitoring survey (a combination of quadrat data and incidental species). This list includes 28 native species and 40 introduced species. Thirty nine species were recorded within quadrats. The quadrat list includes 15 native species and 24 introduced species (Figure 4, Appendix 1.2).

One threatened flora species was recorded during the baseline monitoring, Matted Flax-lily *Dianella amoena* (listed as endangered under the EPBC Act).

5.1.2 Vegetation cover

Percentage cover of indigenous flora was highly variable across quadrats, ranging from 1% to 75% cover. The percentage cover of introduced flora exceeded the cover of indigenous flora in all quadrats, except for

quadrat 2. The higher cover of indigenous flora in quadrat 2 is entirely attributed to the presence of Kangaroo Grass *Themeda triandra*. This was the only indigenous species recorded within this quadrat.

Figure 4 and Figure 5 present the number and cover of indigenous and introduced flora recorded within each quadrat, respectively. The number of introduced flora exceeded the number of indigenous flora in all quadrats. Overall, species richness of indigenous flora was considered low, ranging from 1 to 7 species within the five 5 X 5 meter quadrats.

Figure 4 Number of indigenous and introduced flora species in each quadrat

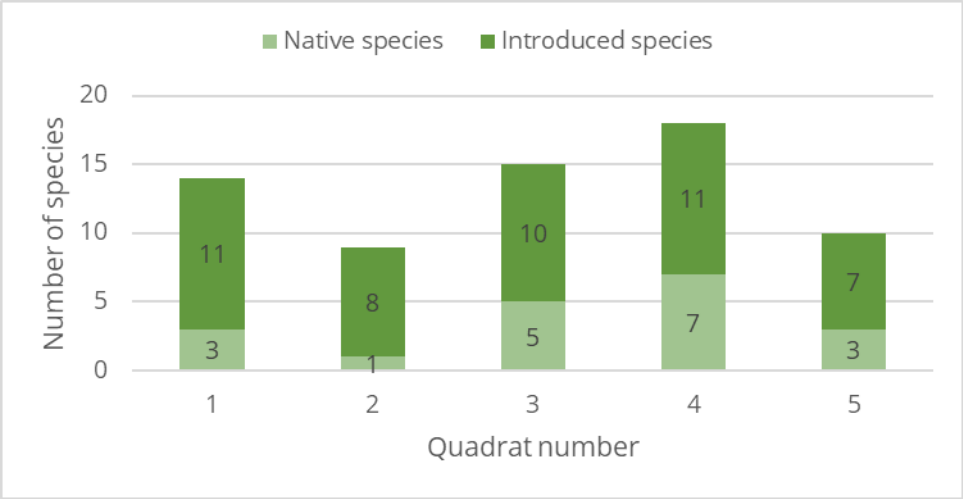
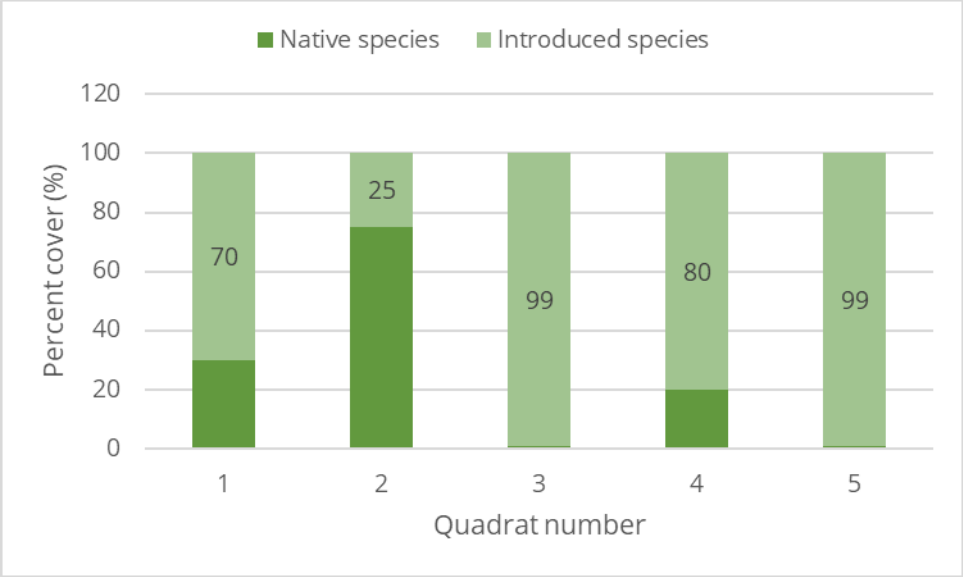


Figure 5 Cover of indigenous and introduced flora species in each quadrat



5.2 Vegetation quality

The offset site must be dominated by high quality native vegetation (site condition score of 30-45/75) by the end of Year 10 as stated in 3.4.1 of the OMP. Table 2 provides habitat hectare results for quadrats 1-5 for the baseline assessment. Site condition scores ranged from 2-12 across the five quadrats.

Table 3 Habitat hectares of the five quadrats within the offset area

Habitat Zone ID			Q1	Q2	Q3	Q4	Q5
EVC #: Name			PGW	PGW	PGW	PGW	PGW
		Max Score	Score	Score	Score	Score	Score
Site condition	Large Old Trees	10	0	0	0	0	0
	Canopy Cover	5	0	0	0	0	0
	Lack of Weeds	15	4	4	0	3	0
	Understorey	25	5	5	0	5	5
	Recruitment	10	0	0	0	0	0
	Organic Matter	5	3	3	2	3	4
	Logs	5	0	0	0	0	0
	Total Site Score		**12**	**12**	**2**	**11**	**9**
Landscape Value	Patch Size	10	1	1	1	1	1
	Neighbourhood	10	0	0	0	0	0
	Distance to Core	5	0	0	0	0	0
	Total Landscape Score		1	1	1	1	1
HABITAT SCORE		100	**13**	**13**	**3**	**12**	**10**
Habitat points = #/100		1	0.13	0.13	0.03	0.12	0.1

Quadrats were placed within the offset area based on topographic variation present (floodplain, rocky slope and elevated plain) and the variation in site conditions (across a spectrum of weed dominated to native vegetation patches), thus some quadrats are missing key components of the EVC Plains Grassy Woodland. i.e. canopy cover. The initial site condition report (Biosis 2019) identified four habitat zones within the offset area. These zones are mapped in Figure 6 and previous VQA scores are presented below in Table 3. Patches of native vegetation scored higher in 2019 than the baseline quadrat data (2021 data), with site condition scores ranging from 17 to 22 out of a possible 75.

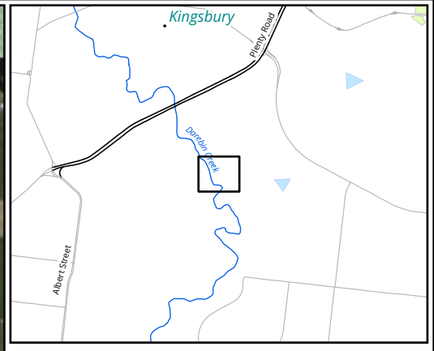
Table 4 Vegetation Quality Assessment results of native vegetation within the offset area (Biosis 2019)

Habitat Zone ID			4.2	7	8	A
EVC #: Name			Plains Grassy Woodland EVC 55			
		Max Score	Score	Score	Score	Score
Site Condition	Large Old Trees	10	0	0	0	0
	Canopy Cover	5	0	5	5	0
	Lack of Weeds	15	4	4	4	4
	Understorey	25	5	5	5	5
	Recruitment	10	5	5	0	5
	Organic Matter	5	3	3	3	3
	Logs	5	0	0	0	0
	Total Site Score		**17**	**22**	**17**	**17**
Landscape Value	Patch Size	10	1	1	1	1
	Neighbourhood	10	0	0	0	0
	Distance to Core	5	0	0	0	0
	Total Landscape Score		1	1	1	1

HABITAT SCORE	100	**18**	**23**	**18**	**18**
Habitat points = #/100	1	0.18	0.23	0.18	0.18

5.2.1 Life forms

Between 7% and 23% of lifeforms were present across the quadrats (**Table 4**). Of those lifeforms present, 33% in quadrat 2 were considered modified (i.e. did not meet species richness or % cover benchmarks), while the remaining lifeforms present in quadrats 1, 3, 4 and 5 were not considered modified. To achieve higher site condition scores, greater richness of species and cover will be required for most of the benchmark lifeforms, such as medium and small shrubs, large, medium and small herbs and large and medium tufted graminoids.



Legend

- Offset area
- ★ Matted Flax-lily within survey area (Biosis 2018)

Habitat Zones

- (VVP_0055_61) Plains Grassy Woodland

Figure 6 Habitat zones within the offset area

0 10 20 30 40 50

Metres

Scale: 1:1,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

N

Matter: 34751,
Date: 17 August 2022 ,
Prepared for: SH, Prepared by: SKM, Last edited by: smitchell
Layout: 34751_F6_HZs
Project: P:\34700s\34751\Mapping\
34751_LaTrobe_Stage3_OffsetMFLmonitoring.aprx

.

Table 5 Assessment of lifeform data against EVC benchmark (Plains Grassy Woodland)

Lifeform	BM # species	BM % cover	Present					Modifed				
			1	2	3	4	5	1	2	3	4	5
Immature Tree (IT)	1	5	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A
Understorey Tree (T)	1	5	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A
Medium Shrub (MS)	3	10	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A
Small Shrub (SS)	2	1	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A
Prostrate Shrub (PS)	1	1	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A
Large Herb (LH)	3	5	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A
Medium Herb (MH)	8	15	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A
Small Herb (SH)	3	5	No	No	No	Yes	Yes	N/A	N/A	N/A	No	No
Large Tufted Graminoid (LTG)	2	5	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A
Medium Tufted Graminoid (MTG)	12	45	No	Yes	No	No	No	N/A	Yes	N/A	N/A	N/A
Medium Non-tufted Graminoid (MNG)	2	5	No	No	No	Yes	No	N/A	N/A	N/A	No	N/A
Bryophytes and lichens	N/A	10	Yes	Yes	Yes	Yes	No	No	No	No	No	N/A
Soil Crust (S/C)	N/A	10	Yes	Yes	No	No	No	No	No	N/A	N/A	N/A
Total number of lifeforms present/modified	13		**2**	**3**	**1**	**3**	**1**	**0**	**1**	**0**	**0**	**0**
Percentage of lifeforms present/modified			**15.38%**	**23.08%**	**7.69%**	**23.08%**	**7.69%**	**0.00%**	**33.33%**	**0.00%**	**0.00%**	**0.00%**

Note: Green highlighted cell=met the benchmark, pink highlighted cell=did not meet the benchmark

5.2.2 Weed management

At the completion of year 10 the offset site must support a population of MFL with a density of 2 to 5 plants per hectare. A key performance target, to assist in attainment of a habitat score of at least 30-45/70, is to eliminate woody weeds and reduce the abundance of perennial, introduced pasture grasses such as Chilean Needle-grass *Nassella neesiana*, Toowoomba Canary-grass *Phalaris aquatica* and Cocksfoot *Dactylis glomerata.* The weed reduction target for introduced perennial grasses is set at 50% of the baseline cover identified by the baseline monitoring. Cover of perennial grasses within quadrats ranged from 22 % to 95% cover, with an average cover of 62% across quadrats.

Achieving the nominated targets will increase the Lack of Weeds score and provide opportunities for additional understorey lifeforms to establish. These outcomes will elevate the offset site condition score to the required level to achieve the defined completion criteria.

The OMP states that total weed cover within the offset site is approximately 50% with a weed target of a reduction to 20%. Mean total weed cover within the five monitoring quadrats during baseline monitoring in October 2021 was 72%.

Table 5 lists the declared noxious weeds and high threat weeds recorded during the baseline monitoring. These weed species should be the focus of future weed management programs at La Trobe University.

Table 6 List of declared noxious weeds and high threat weeds recorded during the baseline monitoring at La Trobe Univeristy offset site

Status under the CaLP Act	Scientific name	Common name
R	*Asparagus asparagoides*	Bridal Creeper
R	*Allium triquetrum*	Angled Onion
RC	*Cirsium vulgare*	Spear Thistle
RC	*Crataegus monogyna*	Hawthorn
RC	Echium plantagineum	Paterson's Curse
RC	*Genista monspessulana*	Montpellier Broom
RC	*Lycium ferocissimum*	African Box-thorn
R	*Nassella neesiana*	Chilean Needle-grass
RC	*Nassella trichotoma*	Serrated Tussock
R	*Oxalis pes-caprae*	Soursob
RC	*Rosa rubiginosa*	Sweet Briar
RC	*Rubus anglocandicans*	Common Blackberry
RC	*Ulex europaeus*	Gorse

5.2.3 Biomass accumulation

Where there is a sustained build up in ground cover biomass over any one year, resulting in a reduction of inter grass tussock space to an average of less than 30%, biomass will need to be actively reduced. Inter-tussock space is important for plant recruitment and is used as a collective term for bare ground, bryophytes, lichens and soil crust, all of which provide a medium upon which plant recruitment can occur (DSE 2004). Across all quadrats there was an average of 7% cover of inter tussock space, which is significantly lower than the target of 30%.

This result corresponded with a mean golf ball score of 7.9, which indicates there is a moderate cover of biomass or 'openness of vegetation' (Shultz et al. 2017) within the offset area.

A low golf ball score is indicative of high biomass or across the offset site. This is evident in quadrat 5, which is dominated by introduced species Cocksfoot, which can grow to 1 meter in height. Table 6 summarises the biomass accumulation results for each of the 5 quadrats.

Table 7 Mean inter-tussock space, golf ball score and maximum vegetation height for the five permanent monitoring quadrats

Quadrat	% Cover of inter tussock space	Mean golf ball score	Mean maximum vegetation height (cm)
1	12%	8.87 - moderate biomass	38
2	8%	6.38 - moderate biomass	31
3	7%	9.75 - moderate biomass	40
4	6%	9.75 - moderate biomass	33
5	0%	4.75 - high biomass	74
MEAN	**7%**	**7.9**	**43**
TARGET	**30% (+/- 10%)**	**≥15 – low biomass**	**≤25 cm**

5.3 Pest animal control

There must be no active rabbit warrens or fox dens within the offset site (Objective 9 of the OMP) and new and emerging pest animals must be controlled (Objective 10 of the OMP). No active rabbit warrens or fox dens and no signs of new and emerging pest animals were recorded during baseline monitoring in October 2021.

Outfoxed Pest Control undertook a survey of the offset site and detected hares and rabbits. After completion of the vermin proof fence around the offset site a shooting program took place on the evening of July 5 2022. The eradication of pest species was confirmed.

5.4 General site condition

As at October 2021, management of the offset site had begun, in preparation for full implementation of the OMP. Photos from established photo points support these observations (Appendix 4)

6. Discussion and recommendations

6.1 Conclusions

La Trobe University satisfactorily complied with the OMP during the 2021/22 reporting year. All specified management actions for the year were completed in accordance with the OMP, except where they were considered not relevant at that point in time.

Given that baseline monitoring was conducted prior to implementation of major conservation management works, some progress is needed towards meeting certain management objectives and targets over the coming years. Particular attention will need to be given to ensuring that vegetation quality and weed control targets are met. This will require diligent implementation of the OMP (e.g. weed control actions), regular monitoring of progress and adapting of management actions accordingly, where relevant. Management of declared noxious weeds should be a high priority in the next 2-3 years.

6.2 Recommendations

6.2.1 Management recommendations

Based on the baseline monitoring, the following management actions in accordance with the OMP will assist in ensuring the 10 year targets for vegetation quality and MFL are met:

- Continue the comprehensive weed management program, including ecological burns under appropriate seasonal conditions.
- Monitor for any new and emerging weeds and continuously treat those weeds to avoid further seed set, dispersal and infestation.
- Revegetate areas not identified as patches with locally indigenous species.
- Continue to undertake biomass reduction to assist with weed control and recruitment of native species.
- Maintain a progressive annual works plan which caters to current conditions and prescribes ongoing management with the promotion of perennial grasses.

6.3 Management actions for 2022/23

Refer to Table 5 of the OMP for management actions specified for year 2 and beyond.

References

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Appendices

Appendix 1 Flora

The following abbreviations and symbols are relevant to this Appendix:

Code	Meaning	Reference
National listings (EPBC Act)		
EX	Extinct	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
CR	Critically endangered	
EN	Endangered	
VU	Vulnerable	
PMST	Protected Matters Search Tool	
State listings (FFG Act and DELWP Advisory List)		
x	Extinct	Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act)
cr	Critically endangered	
e	Endangered	
v	Vulnerable	
t	Threatened	
P	Protected (public land only)	
Weed status (CaLP Act, DCCEEW Weeds of National Significance and DELWP Advisory List[1])		
SP	State prohibited species	Victorian *Catchment and Land Protection Act 1994* (CaLP Act)
RP	Regionally prohibited species	
RC	Regionally controlled species	
R	Restricted species	

[1] The DELWP Advisory List for Rare or Threatened Plants was revoked in 2021 and are superseded by the current list of threatened species under the FFG Act 1988.

A1.1 Flora species recorded from the study area

Table A1.1 Flora species recorded from the study area

Status	Scientific Name	Common Name
Indigenous species		
	Acacia implexa	Lightwood
P	*Acacia mearnsii*	Black Wattle
	Acacia melanoxylon	Blackwood
	Acaena novae-zelandiae	Bidgee-widgee
	Allocasuarina spp.	Sheoak
	Amyema quandang var. *quandang*	Grey Mistletoe
	Anthosachne scabra s.l.	Common Wheat-grass
	Asperula conferta	Common Woodruff
	Atriplex semibaccata	Berry Saltbush
	Carex tereticaulis	Poong'ort
	Cassinia sifton	Drooping Cassinia
EN e cr P	*Dianella amoena*	Matted Flax-lily
	Eleocharis spp.	Spike Sedge
	Eragrostis sp	Love grass
	Eucalyptus camaldulensis	River Red-gum
	Exocarpos spp.	Ballart
	Lepidosperma laterale	Variable Sword-sedge
	Melaleuca ericifolia	Swamp Paperbark
	Oxalis perennans	Grassland Wood-sorrel
	Poa labillardierei	Common Tussock-grass
	Rumex spp.	Dock
	Rytidosperma pilosum	Velvet Wallaby-grass
	Rytidosperma setaceum	Bristly Wallaby-grass
P	*Senecio quadridentatus*	Cotton Fireweed
	Themeda triandra	Kangaroo Grass
Introduced species		
	Aira elegantissima	Delicate Hair-grass
	Allium neapolitanum	Naples Onion
R	*Allium triquetrum*	Angled Onion
	Arctotheca calendula	Cape Weed
R	*Asparagus asparagoides*	Bridal Creeper
	Avena barbata	Bearded Oat
	Briza maxima	Large Quaking-grass
	Briza minor	Lesser Quaking-grass
	Bromus hordeaceus	Soft Brome
	Cenchrus clandestinus	Kikuyu
	Cerastium glomeratum s.s.	Sticky Mouse-ear Chickweed

Status	Scientific Name	Common Name
RC	*Cirsium vulgare*	Spear Thistle
RC	*Crataegus monogyna*	Hawthorn
	Cynodon dactylon	Couch
	Dactylis glomerata	Cocksfoot
RC	*Echium plantagineum*	Paterson's Curse
	Ehrharta erecta	Panic Veldt-grass
	Ehrharta longiflora	Annual Veldt-grass
	Erodium botrys	Big Heron's-bill
	Erodium moschatum	Musky Heron's-bill
	Fraxinus angustifolia	Desert Ash
	Galium aparine	Cleavers
RC	*Genista monspessulana*	Montpellier Broom
	Geranium dissectum	Cut-leaf Crane's-bill
	Helminthotheca echioides	Ox-tongue
	Holcus lanatus	Yorkshire Fog
	Hypochaeris radicata	Flatweed
RC	*Lycium ferocissimum*	African Box-thorn
	Lysimachia arvensis	Pimpernel
R	*Nassella neesiana*	Chilean Needle-grass
RC	*Nassella trichotoma*	Serrated Tussock
R	*Oxalis pes-caprae*	Soursob
	Phalaris aquatica	Toowoomba Canary-grass
	Plantago lanceolata	Ribwort
	Romulea rosea	Onion Grass
RC	*Rosa rubiginosa*	Sweet Briar
RC	*Rubus anglocandicans*	Common Blackberry
	Sonchus asper s.l.	Rough Sow-thistle
	Sonchus oleraceus	Common Sow-thistle
	Trifolium spp.	Clover
RC	*Ulex europaeus*	Gorse
	Verbascum spp.	Mullein
	Vicia sativa	Common Vetch
	Vulpia bromoides	Squirrel-tail Fescue

Table A1.2 Quadrat data – cover abundance of flora species - % cover and Braun Blanquet scale abundance category (2020)

Scientific name	Common name	Q1 % cover	Q1 BB	Q2 % cover	Q2 BB	Q3 % cover	Q3 BB	Q4 % cover	Q4 BB	Q5 % cover	Q5 BB
Indigenous											
Anthosachne scabra s.l.	Common Wheat-grass							1	1		
Asperula conferta	Common Woodruff									1	1
Asperula spp.	Woodruff							1	1		
Eragrostis spp.	Love Grass					1	+				
Eucalyptus camaldulensis	River Red-gum							1	+		
Galium spp.	Bedstraw					1	+				
Geranium spp.	Crane's Bill									1	+
Juncus spp.	Rush							1	1		
Oxalis perennans	Grassland Wood-sorrel					1	+				
Oxalis perennans	Grassland Wood-sorrel							1	1		
Poa labillardierei var. labillardierei	Common Tussock-grass	10	2					20	2		
Rumex spp.	Dock									1	+
Rytidosperma setaceum	Bristly Wallaby-grass					1	+				
Rytidosperma spp.	Wallaby Grass	2	2								
Themeda triandra	Kangaroo Grass	10	2	60	4			1	1		
Introduced											
Aira elegantissima	Delicate Hair-grass	1	1	1	1						
Allium triquetrum	Angled Onion					3	2				
Asparagus asparagoides	Bridal Creeper							3	2		
Avena barbata	Bearded Oat	10	2					2	2		
Briza maxima	Large Quaking-grass	1	1								
Briza minor	Lesser Quaking-grass	1	1			1	+				

Bromus hordeaceus	Soft Brome			1	1						
Cerastium glomeratum s.s.	Sticky Mouse-ear Chickweed	1	1			2	2				
Cirsium vulgare	Spear Thistle									1	1
Cynodon dactylon	Couch					1	1	1	+		
Dactylis glomerata	Cocksfoot			10	2	80	5	20	2	95	5
Ehrharta erecta	Panic Veldt-grass							1	1		
Ehrharta longiflora	Annual Veldt-grass	1	1								
Hypochaeris radicata	Flatweed	1	+			1	+	1	+	1	1
Nassella leucotricha	Texas Needle-grass							1	1		
Nassella neesiana	Chilean Needle-grass	20	2	5	2			5	2		
Nassella trichotoma	Serrated Tussock	10	2	2	2			25	2		
Phalaris aquatica	Toowoomba Canary-grass			5	2						
Plantago lanceolata	Ribwort			1	1	1	+			1	1
Sonchus asper s.s.	Rough Sow-thistle	1	+			1	+	1	+		
Sonchus oleraceus	Common Sow-thistle	1	+			1	+	1	+	1	1
Trifolium spp.	Clover					2	2				
Ulex europaeus	Gorse									1	1
Vicia spp.	Vetch	1	1	1	1	3	2			2	2

Appendix 2 Photos of the study area

1. Photo points – Quadrats 1 – 5

Quadrat 1 NW - Photo point 1 NW

Quadrat 1 NE - Photo point 1 NE

Quadrat 1 SE - Photo point 1 SE

Quadrat 1 SW - Photo point 1 SW

Quadrat 2 NW - Photo point 2 NW

Quadrat 2 NE - Photo point 2 NE

Quadrat 2 SE - Photo point 2 SE

Quadrat 2 SW - Photo point 2 SW

			
Quadrat 3 NW - Photo point 3 NW	Quadrat 3 NE - Photo point 3 NE	Quadrat 3 SE - Photo point 3 SE	Quadrat 3 SW - Photo point 3 SW
			
Quadrat 4 NW - Photo point 4 NW	Quadrat 4 NE - Photo point 4 NE	Quadrat 4 SE - Photo point 4 SE	Quadrat 4 SW - Photo point 4 SW
			
Quadrat 5 NW - Photo point 5 NW	Quadrat 5 NE - Photo point 5 NE	Quadrat 5 SE - Photo point 5 SE	Quadrat 5 SW - Photo point 5 SW

2. Compliance monitoring photos

1. Intact fencing around the offset area

2. Locked gate and signage

3. Established track through offset area

4. Evidence of weed control – Spray on Serrated Tussock