Whole Farm Plan:

Proposal to clear and offset native vegetation at *951 Stokes Bay Road, Duncan, Kangaroo Island*

Data Report

Clearance under section 28 of *The Native Vegetation Act 1991*

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Application information

Applicant:	Mine Creek Partners		
Key contact:	Simon Kelly 0438 992 223 smkelly@minecreek.com.au		
Landowner: *(if the applicant is not the landowner, you must attach written permission)*	Simon Kelly Proprietor Mine Creek Partners 951 Stokes Bay Road, Duncan smkelly@minecreek.com.au		
Site address:	951 Stokes Bay Road		
Local Government Area:	Kangaroo Island Council	Hundred:	Duncan
Certificate of Title	CT/5194/393	Section/ Allotment:	H110100 S53
Certificate of Title	CT/5194/393	Section/ Allotment:	H110100 S52
Certificate of Title	CT/5257/507	Section/ Allotment:	D41835 A3
Certificate of Title	CT/5297/290	Section/ Allotment:	F161064 Q1
Certificate of Title	CT/5297/290	Section/ Allotment:	F161064 Q2
Summary of Application			
Proposed clearance area:	The proposed clearance area is 13.77Ha plus 18 scattered trees, requiring 957.55 SEB points of offset. 12.21Ha of the clearance area (not counting scattered trees) is native and occurs across eight sites (vegetation associations) within six discrete vegetation blocks. Another 1.56Ha of exotic pines will also be cleared.		
Purpose of the clearance:	In broad terms, the clearance is aimed at improving the efficiency of the grazing production system. There are specific reasons for each of the sites which are discussed in the report. These include increasing the size of very small paddocks for machinery access or increased grazing area, increasing size of important fodder-crop paddocks, reducing root competition etc.		
Proposed SEB offset:	It is proposed to provide property-wide offsets of 144.15Ha (492.73 SEB points) though new/increased Heritage Agreements over previously fenced native vegetation, and 89.24Ha (527.74 SEB points) of native vegetation which will be managed to exclude stock through fencing. The total proposed offset would be 233.29Ha providing 1020.47 SEB points.		

Background

Purpose of the proposal

The proposal relates to a family grazing property which was first established in 1936. The family wishes to produce a whole-farm plan in an attempt to achieve two goals. The first is to improve the efficiency of their production system through targeted removal of native vegetation. The second is to maintain (fix in place) and improve the remainder of the native vegetation by Heritage Agreement, stock exclusion and some augmentation of native vegetation. Revegetation with native species is also being undertaken but is additional to the offsets proposed here. Improvement and augmentation of remaining native vegetation is a key priority of the current farm manager prior to passing on management to the next generation of the family.

Property history and proposed actions

The property has historically been used for grazing (wool) and for fodder crops that support the grazing operation. A significant proportion of the property was never cleared and it now contains some of the significant vegetation in the surrounding area. Clearance of the property continued sporadically until the mid-1980s. In 1991 the Native Vegetation Act was introduced and this prevented some of the cleared land (7.44 Ha) from being utilised for grazing as it was by then regrown beyond the 5-year limit allowed for unregulated clearance. This area forms the majority of the proposed clearance in this application. Around the same time, two large areas of remnant bushland were each placed under a Heritage Agreement under a government incentive scheme.

The farm itself is very well managed with good quality fencing, minimal non-managed areas and more remnant native vegetation than most other farming properties in the broader region. Some of the native vegetation on the property is very high quality and a number of the most of the significant creeklines have been fenced to exclude stock through Landcare programs. The family is proud of the native vegetation under their custodianship and is undertaking significant native revegetation at their own cost, in the least vegetated area of the farm, independent of (additional to) the SEB offsets proposed in this application. During the vegetation surveys there was evidence of previously lopped pine trees that had become weedy in native vegetation. As part of this application, it is also proposed to remove 1.56 Ha of *Pinus radiata*, which will remove a large seed source from nearby vegetation which is proposed for offsetting.

The proponents wish to clear a total of 12.21 Ha of native vegetation and 18 scattered *Eucalyptus cosmophylla*, requiring 967.55 SEB offset points. Reasons for each clearance are discussed in the section dealing with the relevant vegetation assessments. It is proposed that an SEB offet will be provided through Hertiage listing of 144.15 Ha (492.73 SEB points) and stock exclusion fencing of a further 89.24 Ha (527.74 SEB points), providing a total SEB offset of 233.29 Ha (1020.47 SEB points).

The proponents are hoping to begin clearance in Febraury 2020.

Property, location and land use maps

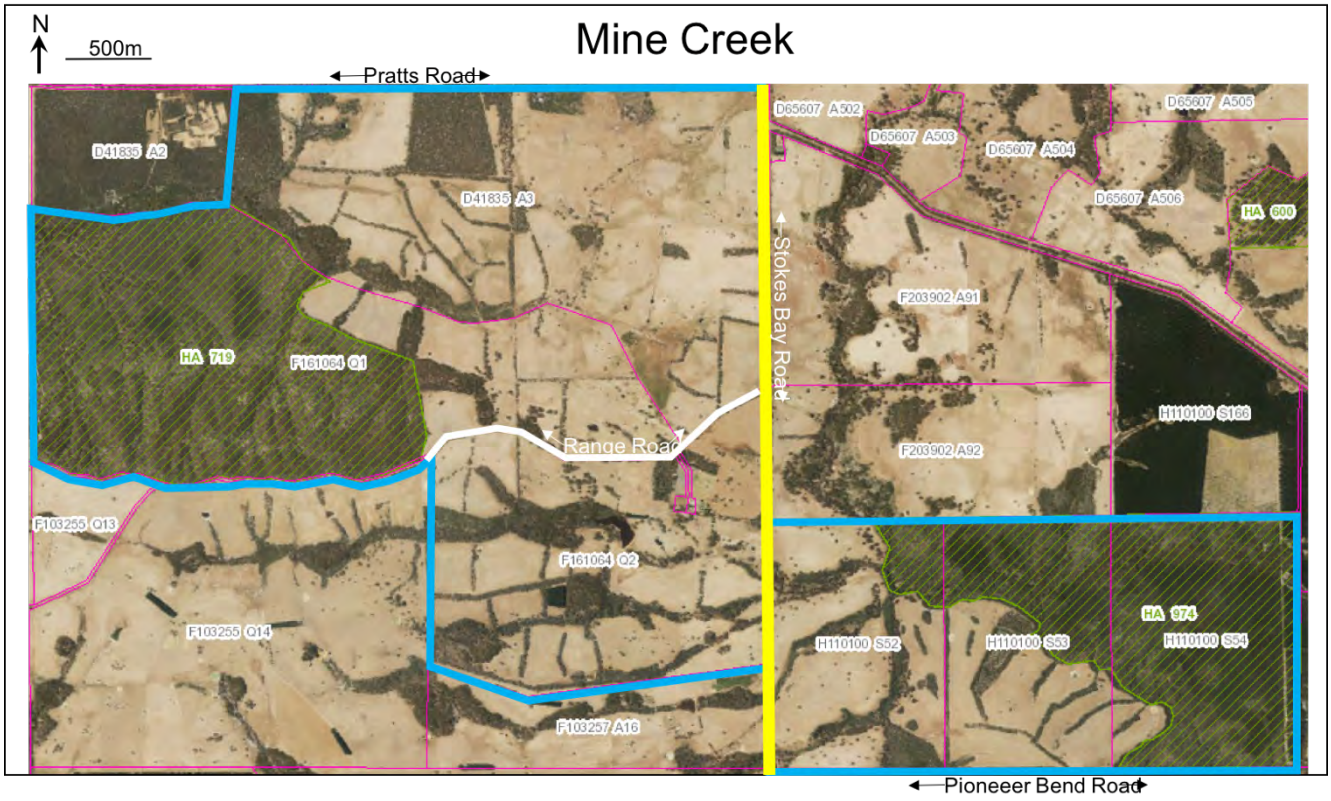


Figure 1: Property area (blue boundary) located at 951 Stokes Bay Road, Duncan, Kangaroo Island. Stokes Bay Road is yellow. Cadastral boundaries and associated section and allotment numbers are shown in pink. Existing Heritage Agreements are shown shaded with crossed green lines.

Figure 2: Regional location of property in the Hundred of Duncan, north-central Kangaroo Island.

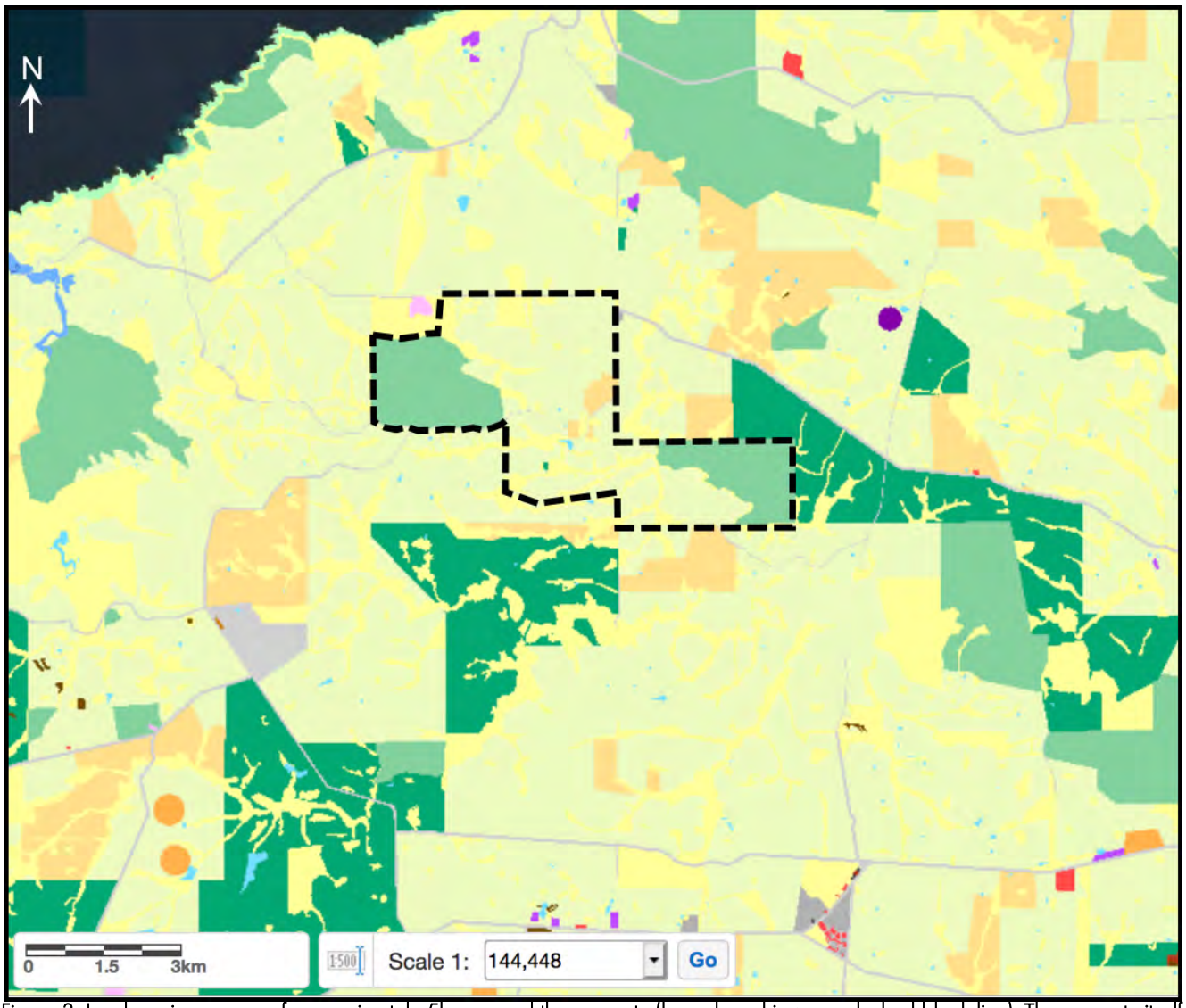


Figure 3: Land use in an area of approximately 5km around the property (boundary shiown as dashed black line). The property itself is largely used for grazing (light green), conservation (heritgage agreements in medium green) and other native vegetation (yellow). The landscape surrunding landscape is largely associated with various forms of primary production or conservation (medium green), interspersed with unprotected native vegetation (yellow). Primary production includes dryland grazing (light green), cropping (light brown), and forestry (dark green), with a smaller amount of irrigated cropping (dark purple).

Approvals required *or* obtained under other legislation (including past clearance approvals)

Native Vegetation Act 1991 – current clearance proposal is the subject of this application.

There are no approvals required/obtained by the proponent, under other legislation including:
Development Act 1993
Fire and Emergency Services Act 2005
Water Resources Act 1997
Environment Protection and Biodiversity Conservation Act 1999
Coast Protection Act 1972
Pastoral Land Management and Conservation Act 1989
Environment Protection Act 1993
River Murray Act 2003
National Parks and Wildlife Act 1972
Natural Resources Management Act 2004
Aboriginal Heritage Act 1988

The proponent advises that no further development or clearance is planned for the site, other than that stated in this report.

Methods

Delineation of Blocks and Sites.

Vegetation in this landscape was rarely contiguous within grazed areas although it often appears to be from aerial imagery. The native vegetation generally occurred as discrete patches with gaps of around 20m between them. One approach would be to treat the entire area as one contiguous block. However, due to the large area containing numerous sites it was decided that for consistency, and to give a more accurate representation of the vegetation (e.g. cleared perimeter to area ratio) that sites would only be lumped into blocks only if they were actually contiguous. This approach also makes sense from a management perspective as these discrete blocks may ultimately be managed separately by activity and temporally (e.g. clearance, fencing, Heritage Agreement).

This resulted in the delineation of 71 sites (one is a scattered tree site) occurring across 32 blocks. Nine of these sites were assessed for clearance (including the scattered trees) (Table 1), and 62 sites assessed for SEB offset (15 through Heritage Agreements and 47 through fencing/stock exclusion; see Tables 2 and 2, respectively).

Maps showing the assignment of vegetation bocks (and site boundaries) for assessment, are shown in Figures 5-7. Sites and their proposed outcomes (clearance, Heritage Agreement, fencing) are shown in Figures 8-11.

Areas of Blocks and Sites (and cleared perimeters of Blocks) were calculated using Google Earth Pro 7.3.2.5776.

Assessment methodologies used.

Three different methods were used to calculate the SEB points associated with clearance or offset:

- Bushland Assessment – 2019 method (69 sites)
- Bushland Assessment (small site; <0.5Ha) – 2019 method (one site)
- one Scattered Tree Assessment – 2017 method

Much of the survey was conducted prior to the 2019 methodology being established. However, because the NVU considers the 2019 method to be a more accurate reflection of offset values, data for the Bushland Assessments were converted for use with the latest method. However, this was not possible for the Scattered Tree Assessment because absolute values are required in the 2019 method, which were not obtained under the 2017 method. Therefore, the Scattered Tree Assessment is the only assessment conducted under 2017 methods.

Flora assessments

Prior to visiting the property, the potential species that might be encountered were assessed by using NatureMaps to produce a potential species list (including listed species) based on previous records occurring within a 10km radius of a point central to the property (same as centroid of EPBC search; see bloew). EPBC search results were also considered. Where plant species were not immediately identifiable, photos or vouchers were taken for subsequent assessment in conjunction with various sources of literature (see Bibliography).

Vegetation assessments were applied to sites using the following criteria:

- within a block, if there was one contiguous vegetation association, but containing areas propose as having different outcomes (e.g. clearance vs fencing), then they were counted as different sites and separate Bushland Assessments were conducted for each site (e.g. sites F29 and H11).
- multiple sites were covered under a single BA (conducted at one of the sites) if they occurred as disjunct sites of the same vegetation within the same block (e.g. sites H1 and H4 are covered by H1 assessment).
- often, when the same vegetation type occurred as nearby disjunct sites (within the same or different blocks) a combined assessment was derived from sub-quadrats at each site (e.g. F17 and F28).
- if the same vegetation type occurred nearby but in different blocks, in some cases the assessment was conducted at one site and a modified version used for the other site(s) based on observed differences (e.g. site F42 used a modified version of C4 assessment).

Information about how assessments were applied to sites is contained in Tables 1-3. A map of the broad vegetation types occurring across the property is shown in Figure 12 and this is colour-coded with tables 1-3 to allow matching of vegetton types between the table and map.

Due to differences in historical grazing pressure there was often significant variation within a site. This was mainly with regard to the degree of weed infestation and litter, as well as plant diversity. Attempts were made to capture this variation in two main ways:

- if variation occurred in discrete areas then the area was treated as separate sites with separate assessments (e.g. sites F25 and F26)
- if the variability was patchy/random then an "average" assessment was produced from multiple sub-quadrats examples of the variability were photographed (e.g. site F10).

In most cases, quadrats were photographed (usually with S, W, N & E views) as well as some extra sites to represent variability within a site and to act as future reference points for management outcomes. All quadrat photos and are provided in APPENDIX 1. Supplementary (often external) photopoints are provided at the end of the main report.

Fauna assessment

Prior to visiting the property, the potential species that might be encountered were assessed by using NatureMaps to produce a potential species list based on previous records occurring within 10km radii of a point central to the blocks proposed for clearance (same as centroid of EPBC search, see next). Fauna was noted during vegetation assessments. Threatened fauna species reports were conducted as for flora (see above). If evidence of previous digging by Goannas or Echidnas was noted, these species were listed as present.

EPBC Protected Matters Search

Due to the large number of sites, and large distances between some of the sites, one EPBC Protected Matters search was performed to cover the whole property. Sites proposed for clearance/offset were a maximum of 7km apart. The centroid for the search was placed in the nearest site (C8) to the half way point of this 7km transect (located at -35.69986°N,137.20322°E). The search radius was set at 10km to be conservative with regard to the EPBC-listed species that might be impacted. Results of the 10km EPBC search are provided near the end of this report.

When considering the search results, species whose Type of Presence was classified as *Species or species habitat likely to occur in area* or *Breeding known to occur within area* were assessed as EPBC matters for all sites, after removal of sea birds which do not utilise the area as habitat.

Maps and spatial calculations

Cadastral, location and land use maps were obtained using NatureMaps 3.0. Block and site maps (and shapefiles) were produced using Google Earth Pro 7.3.2.5776 (except Scattered Tree map using NatureMaps). Additional map annotations were produced using Powerpoint for Mac (15.24). Site photos and GPS data were obtained using the ContextCam app on an iPhone 6. Area and perimeter measurements were obtained using Google Earth Pro. Where required, boundaries between sites occurring within a block were obtained by taking waypoints of observed boundaries and observing satellite imagery.

Sections, Blocks and Sites

Site identification system

Sites (vegetation associations) are labelled with a prefix which indicates their status as follows:

- C = sites proposed for clearance (C1..C8) – see table1for summary,
- H = sites proposed as SEB offset via Heritage Agreement (H1..H15) – see table 2 for summary,
- F = sites proposed as SEB offset via management: stock exclusion through fencing (i.e. F1..F47) – see table 3 for summary.

Map of Property Sections

Due to the large number of sites and ease of displaying mapped information, the property has been broken into three Sections, named based on roads at their margins (Pioneer section, Range section and Pratt section; Figure 4). Figures 5-7 show the delineation of Blocks in the Pioneer, Range and Pratt sections, respectively. Figures 9-11 show the delineation of Sites (and their proposed outcomes) in the Pioneer, Range and Pratt sections, respectively.

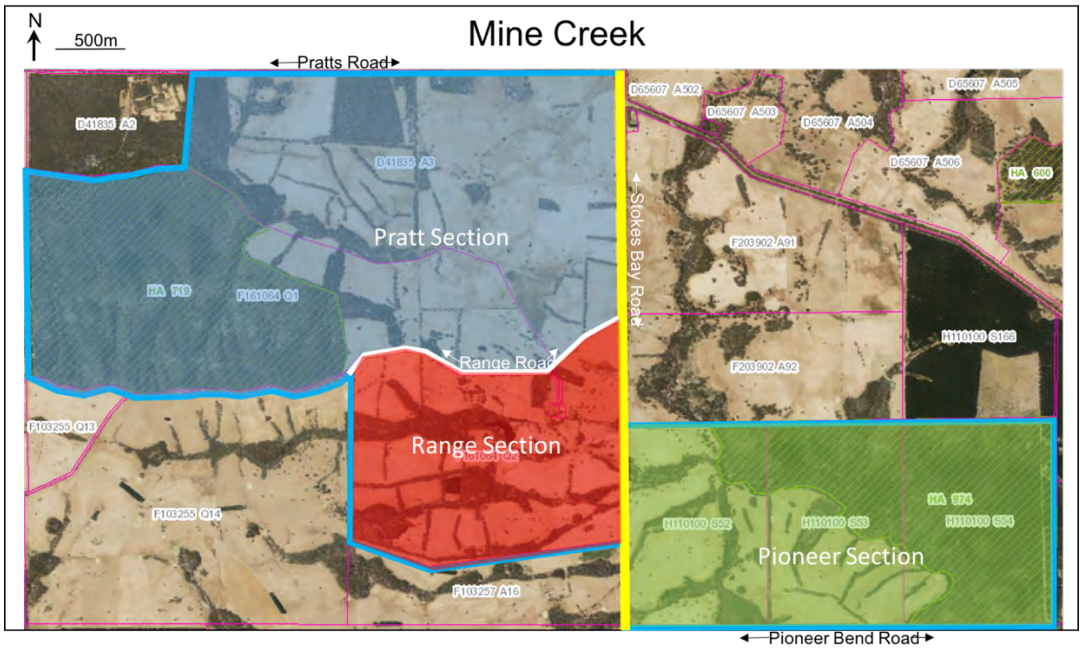


Figure 4: Property area (blue boundary) located at 951 Stokes Bay Road, Duncan, Kangaroo Island. The property has three "sections" separated by roads, *viz*: Pratt Section shaded blue, Range Secrion shaded red and Pioneer Section shaded green. Stokes Bay Road is yellow. Cadastral boundaries and associated section and allotment numbers are shown in pink. Existing Heritage Agreements are shown shaded with crossed lines. The section in which a given block or site occurs is shown in Tables 1-3.

Maps of Blocks in Each Section

Figures 5-7 show the delineation of Blocks in the Pioneer, Range and Pratt sections, respectively. The methods explain how Blocks and Sites were delineated. Figures 9-11 show the delineation of Sites (and their proposed outcomes) in the Pioneer, Range and Pratt sections, respectively. Tables 1-3 link blocks to sites, and summarise generic information for all sites.

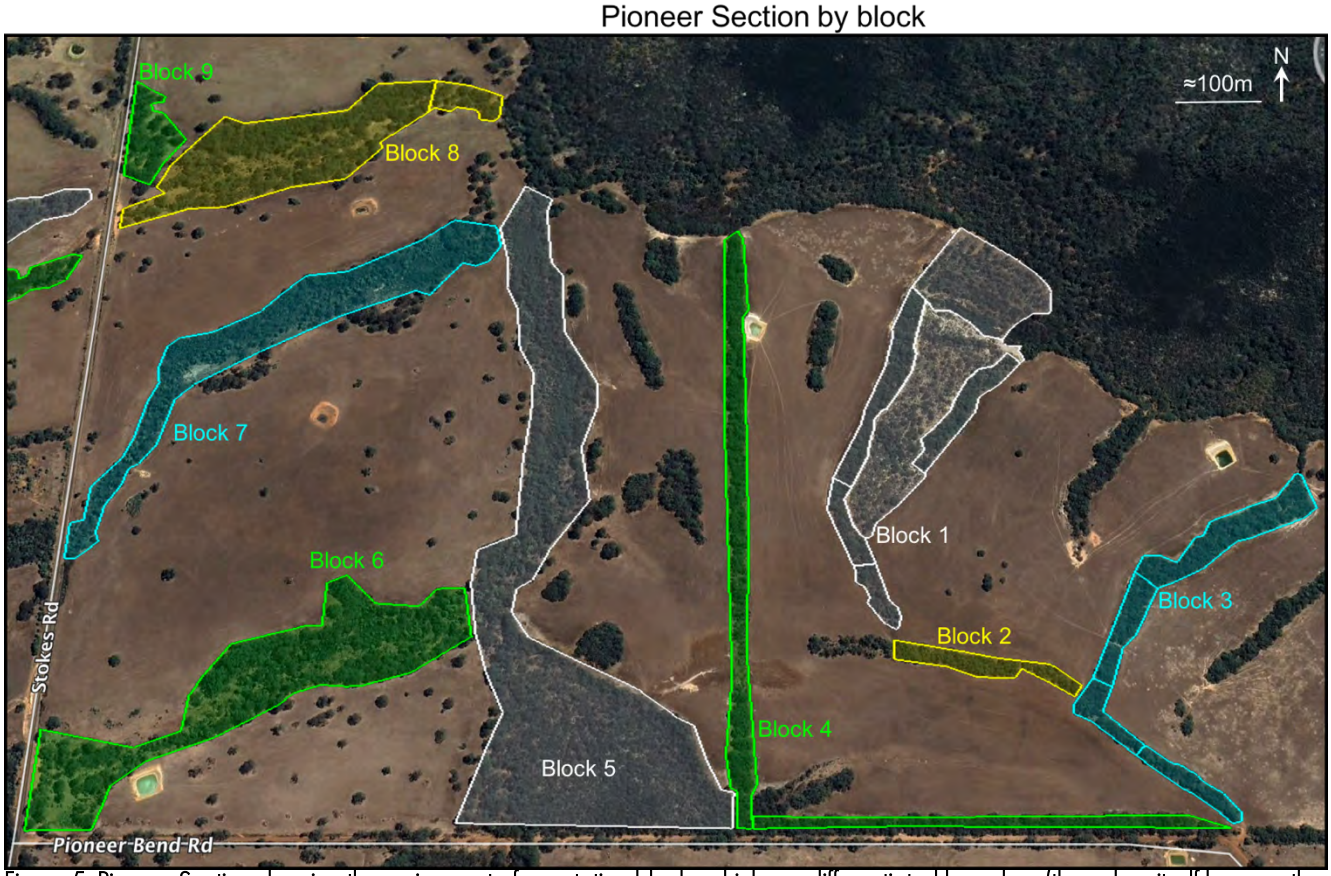


Figure 5. Pioneer Section showing the assignment of vegetation blocks which are differentiated by colour (the colour itself has no other meaning). Blocks are numbered and site boundaries are visible as internal boundaries within blocks.

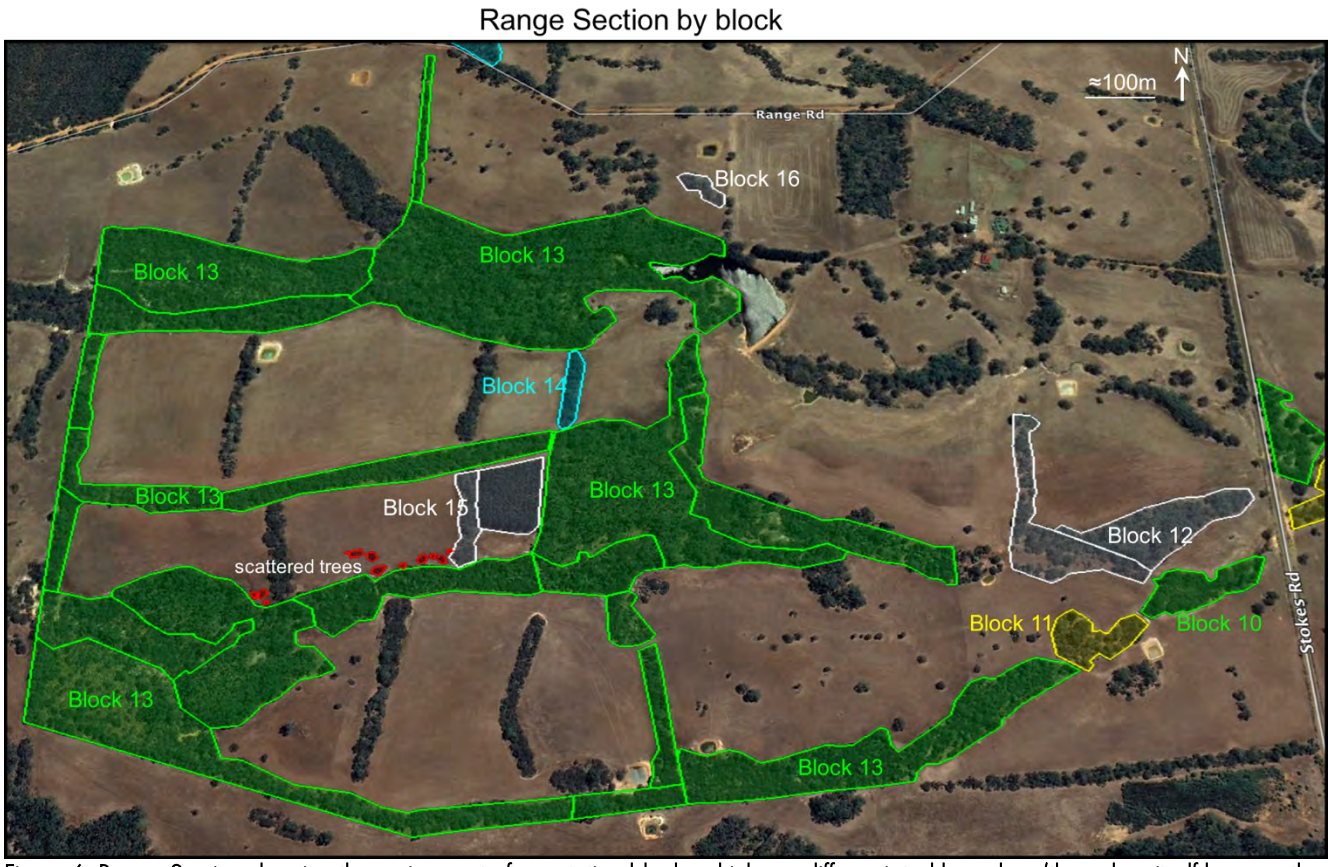


Figure 6. Range Section showing the assignment of vegetation blocks which are differentiated by colour (the colour itself has no other meaning). Blocks are numbered and site boundaries are visible as internal boundaries within blocks. The Scattered Tree site is also shown in red.

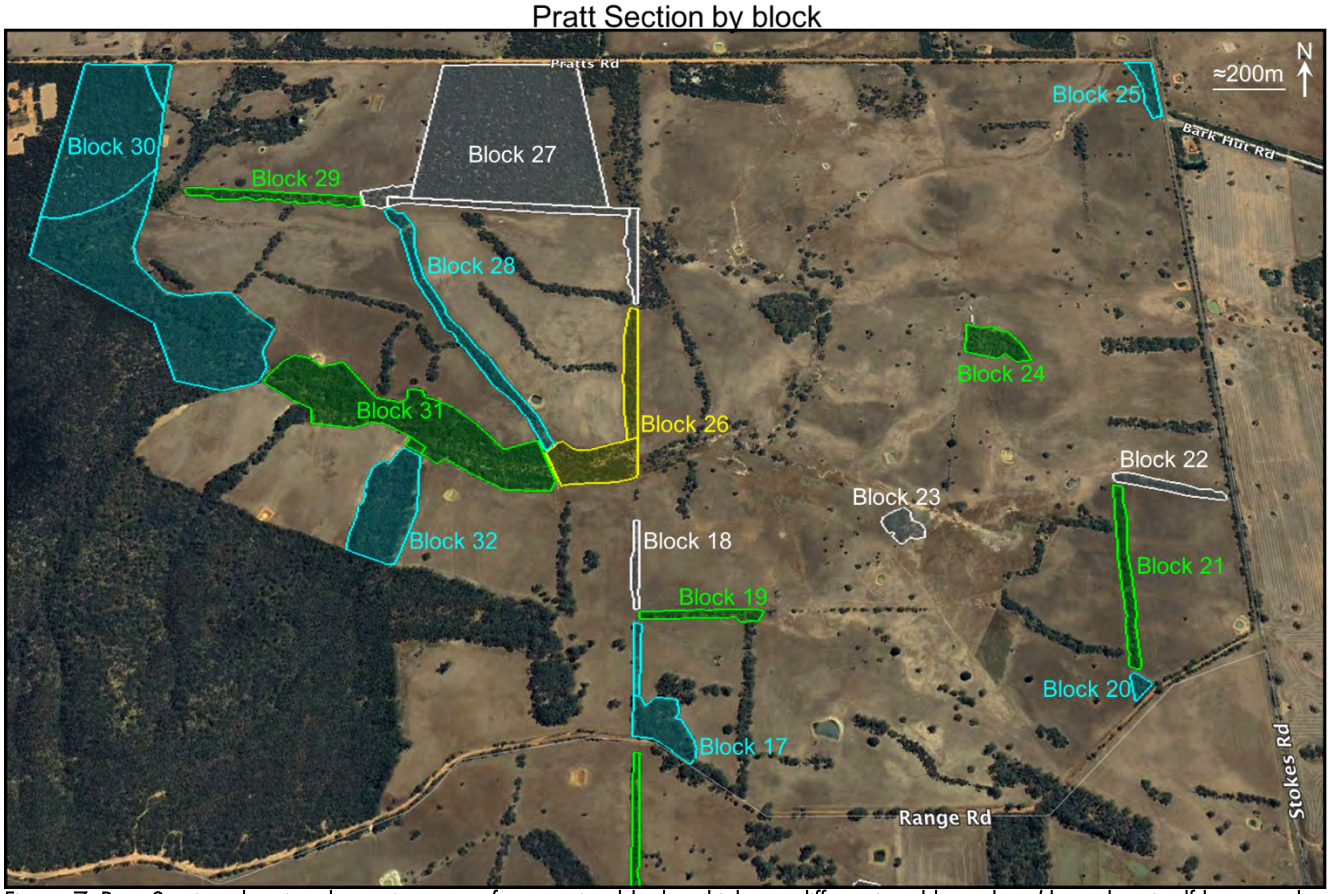


Figure 7. Pratt Section showing the assignment of vegetation blocks which are differentiated by colour (the colour itself has no other meaning). Blocks are numbered and site boundaries are visible as internal boundaries within blocks.

Maps of Sites and Their Proposed Outcomes

Figure 8 shows the delineation of Sites (and their proposed outcomes) for the entire property. Figures 9-11 show the delineation of Sites (and their proposed outcomes) in the Pioneer, Range and Pratt sections, respectively. Tables 1-3 can be used to link blocks to sites, and obtain information on area, and assessment methods. The methods explain how Sites were delineated.

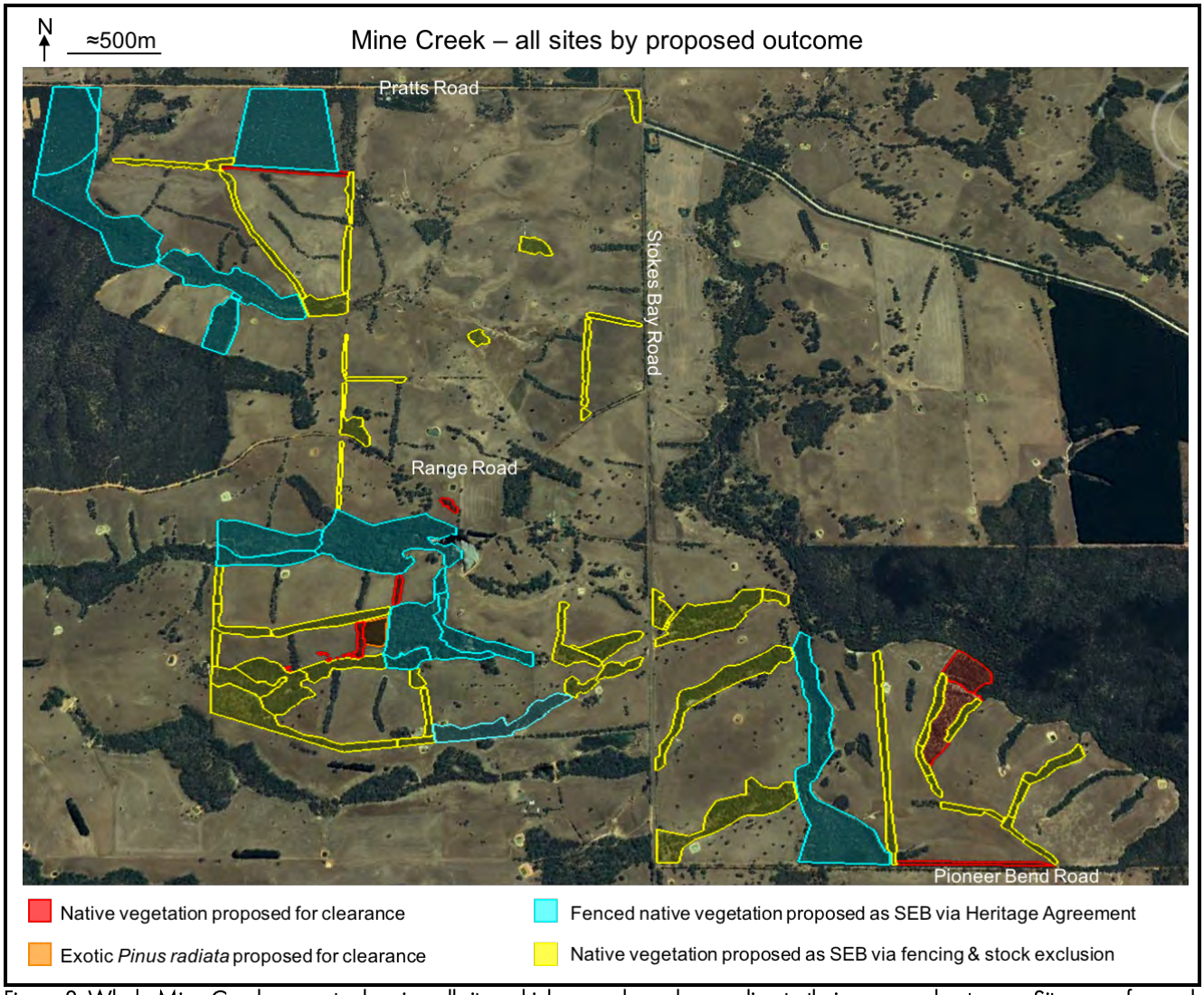


Figure 8. Whole Mine Creek property showing all sites which are coloured according to their proposed outcome. Site maps for each section are shown in the following three figures.

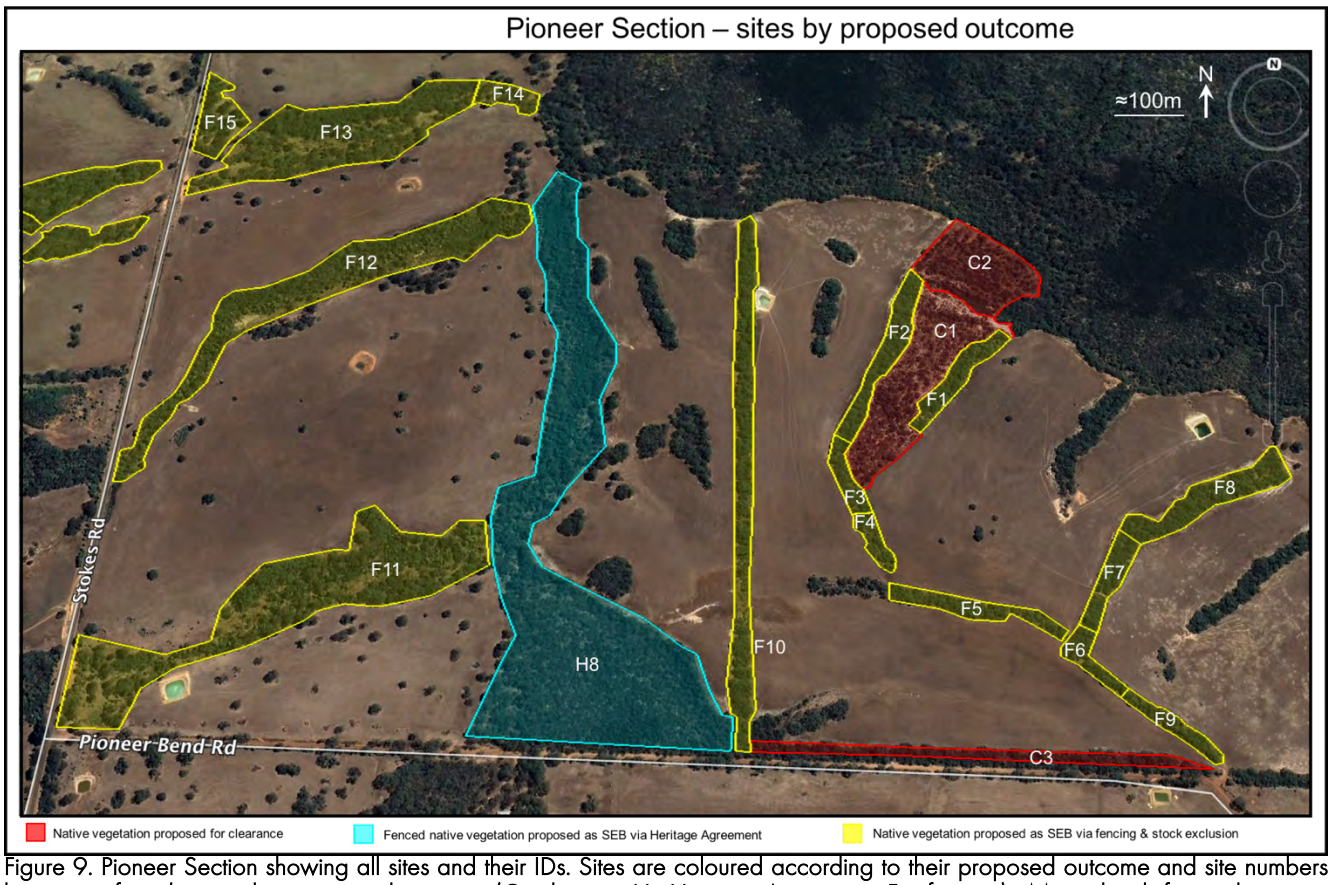


Figure 9. Pioneer Section showing all sites and their IDs. Sites are coloured according to their proposed outcome and site numbers have a prefix indicating their proposed outcome (C - clearing, H - Heritage Agreement, F – fencing). More details for each site are provided in Tables 1-3.

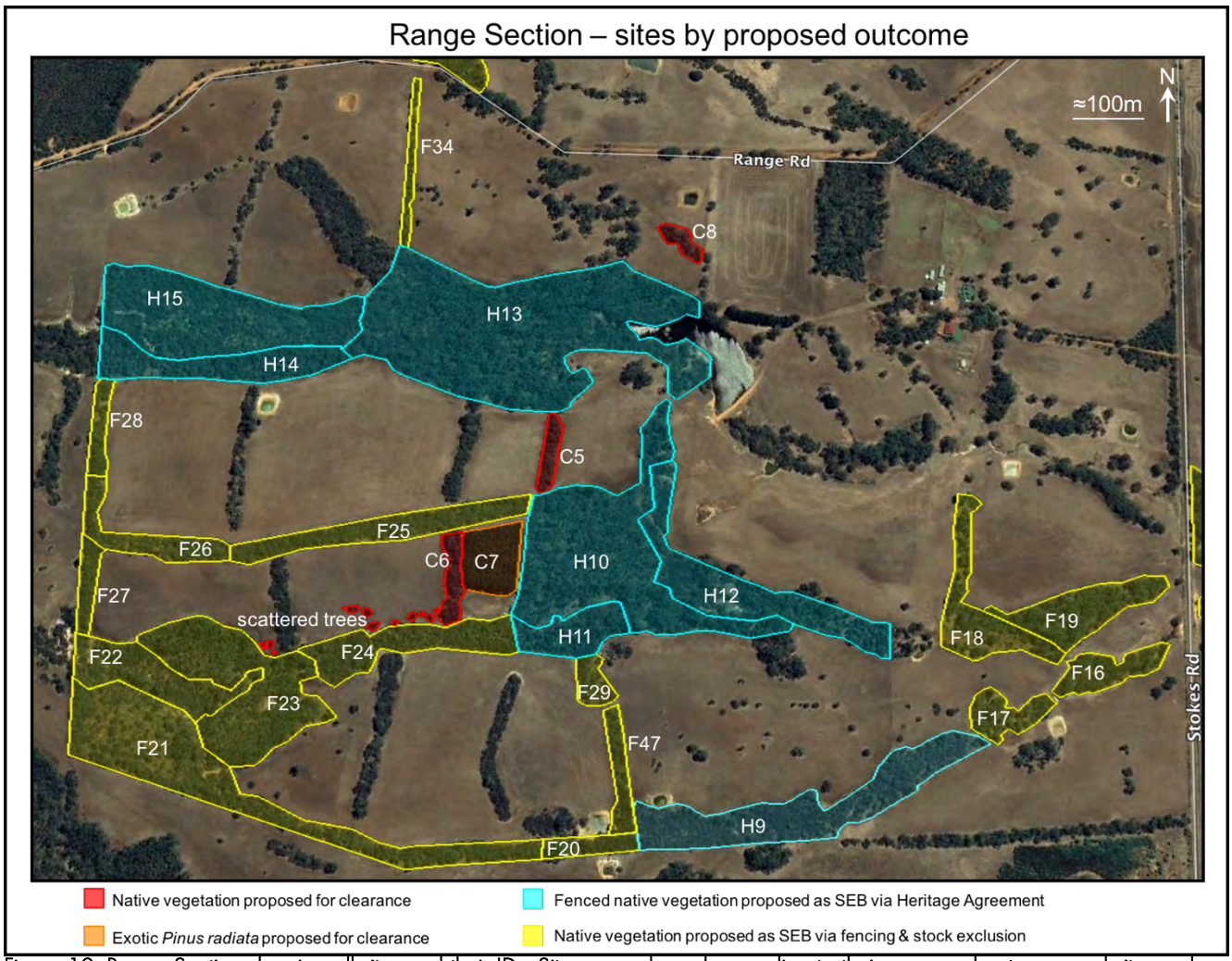


Figure 10. Range Section showing all sites and their IDs. Sites are coloured according to their proposed outcome and site numbers have a prefix indicating their proposed outcome (C - clearing, H - Heritage Agreement, F – fencing). More details for each site are provided in Tables 1-3.

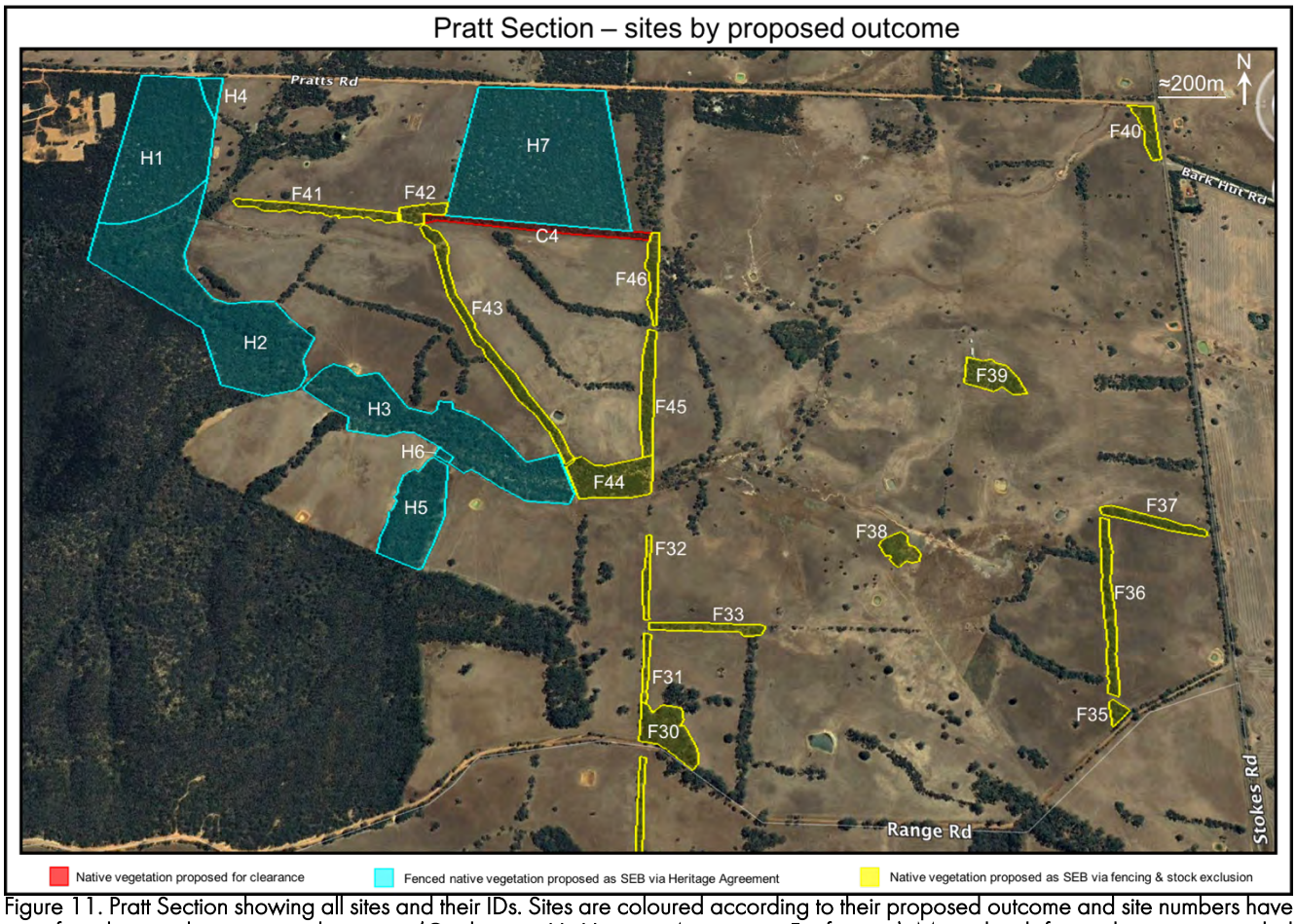


Figure 11. Pratt Section showing all sites and their IDs. Sites are coloured according to their proposed outcome and site numbers have a prefix indicating their proposed outcome (C - clearing, H - Heritage Agreement, F – fencing). More details for each site are provided in Tables 1-3.

Maps of Sites and Their Broad Vegetation Associations

Figure 12 defines the broad vegetation associations for all sites on the property. The vegetation associations are colour-coded to match the site lists in Tables 1-3, which link blocks to sites, and contain information on area, number of photopoints and assessment methods.

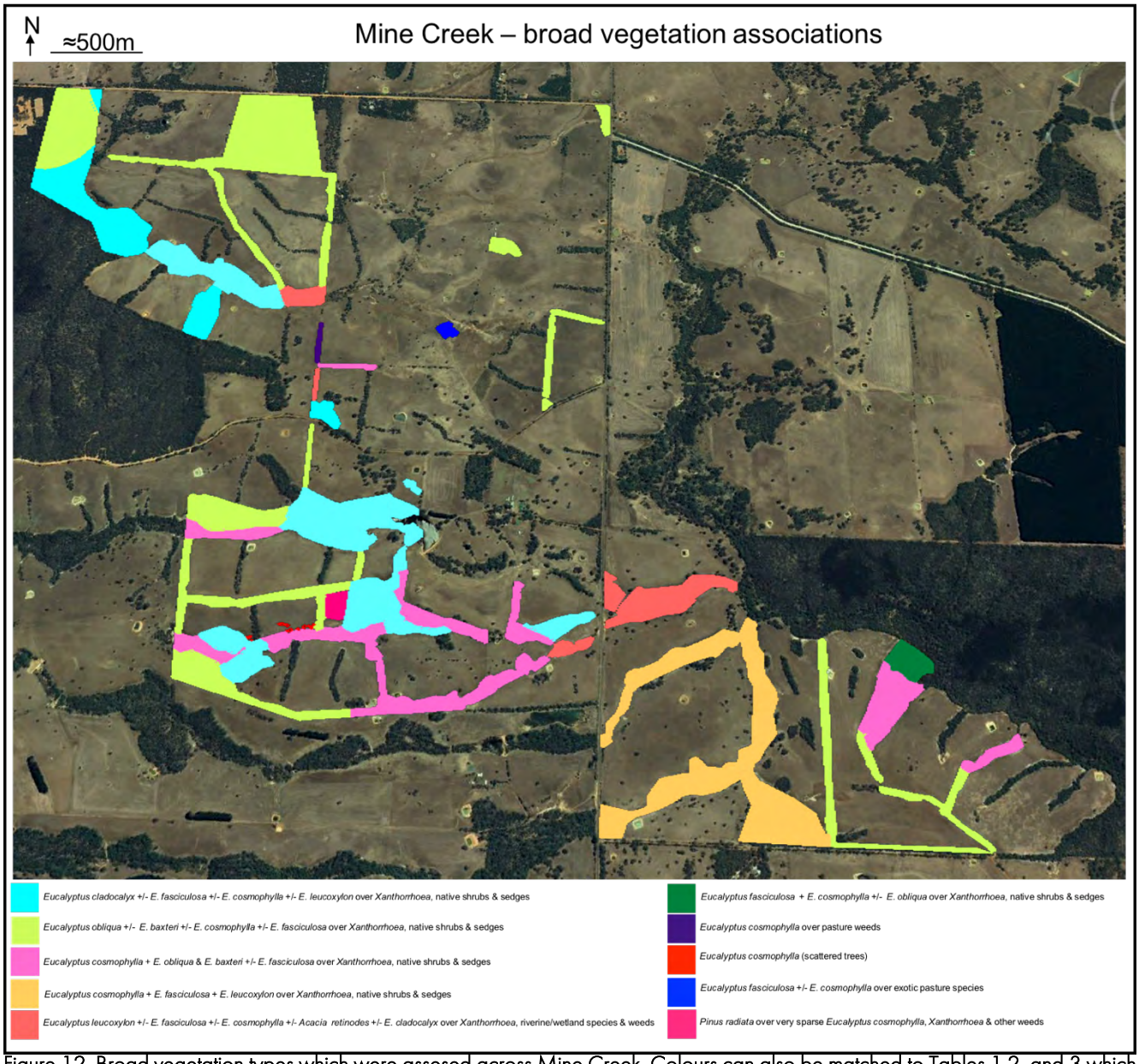


Figure 12. Broad vegetation types which were assesed across Mine Creek. Colours can also be matched to Tables 1,2 and 3 which contain site lists and associated information.

Site Lists

Tables 1, 2 and 3 provide lists of sites proposed for clearance, Heritage Agreement, and fencing/stock exclusion, respectively. These tables are colour-coded to match the vegetation types shown on the map above in Figure 12. Tables contain information on which section and block each site is associated with as well as the area, perimeter, vegetation type, relevant benchmark community, number of internal photopoints, and details of the assessment method, for each site.

Table 1. Summary of the eight sites proposed for clearance (hence C prefix in site IDs), plus the group of scattered trees. Rows are coloured to correspond to the borad dominant vegetation type as per the map shown in Figure12. The total area proposed for clearance is 13.37Ha plus 18 scattered trees, however, 1.56Ha of this area (site C7) is exotic *Pinus radiata*. A map showing the division of the property into sections is shown in Figure 4.

Site	Block	Section	Area (Ha)	Perimeter (m)	Benchmark Vegetation Community	Number of internal photopoints	Assessment Method
C1	1	Pioneer	4.33	1248	KI 2	1	BA
C2	1	Pioneer	3.11	706	KI 2	1	BA
C3	4	Pioneer	1.21	1539	KI 1.1	1	BA
C4	27	Pratt	2.00	1559	KI 1.1	1	BA
C5	14	Range	0.50	373	KI 1.1	1	BA
C6	15	Range	0.66	466	KI 1.1	1	BA
C7	15	Range	1.56	492	KI 1.1	1	BA
scattered trees	n/a	Range	18 trees	n/a	n/a	All trees photograhped	STA
C8	16	Range	0.40	297	n/a	1	BA <0.5Ha
		TOTAL AREA	13.37				

BA: Bushland Assessment; STA: Scattered Tree Assessment; n/a: not applicable; Ha: hectares; m: metres.
KI 1.1: Woodlands, low woodlands and mallee with desne sclerophyll shrub understorey
KI 2: Open forests and woodlands with an open sclerophyll shrub understorey

Table 2. Summary of the 15 sites proposed for listing under Heritage Agreements (hence H prefix in site IDs). Rows are coloured to correspond to the borad dominant vegetation type as per the map shown in Figure12. The total area proposed for Heritage listing is144.15Ha. Numbers after the assesment method indicate the site(s) which were used to generate the relevant Bushland Assessment. A map showing the division of the property into sections is shown in Figure 4.

Site	Block	Section	Area (Ha)	Perimeter (m)	Benchmark Vegetation Community	Number of internal photopoints	Assessment Method
H1	30	Pratt	15.9	1632	KI 1.1	1	BA
H2	30	Pratt	19.2	2561	KI 7.2	2	BA
H3	31	Pratt	11.9	2206	KI 7.2	1	BA
H4	30	Pratt	0.83	469	KI 7.2	None: refer H2	BA (H2)
H5	31	Pratt	0.14	458	KI 3	None: refer H6	BA (H6)
H6	32	Pratt	4.56	908	KI 3	1	BA
H7	27	Pratt	28.5	2154	KI 1.1	1	BA
H8	5	Pioneer	16.9	3121	KI 7.2	3	BA
H9	13	Range	4.92	1649	KI 7.2	2	BA
H10	13	Range	7.5	1620	KI 3	2	BA
H11	13	Range	1.61	641	KI 7.2	1	BA (H11/H12)
H12	13	Range	4.2	1575	KI 7.2	2	BA (H11/H12)
H13	13	Range	16.2	2502	KI 7.2	4	BA
H14	13	Range	3.17	1217	KI 7.2	1	BA
H15	13	Range	7.28	1371	KI 1.1	1	BA
TOTAL AREA			144.15				

BA: Bushland Assessment; Ha: hectares; m: metres.
KI 1.1: Woodlands, low woodlands and mallee with dense sclerophyll shrub understorey
KI 3: Open forests with a sparse shrub and herbaceous undeerstorey
KI 7.2: Riparian open forests and woodlands with dense shrub understorey

Table 3. Summary of the 43 sites proposed for fencing/stock exclusion (hence F prefix in site IDs). Rows are coloured to correspond to the borad dominant vegetation type as per the map shown in Figure12. The total area proposed for fencing is 89.24Ha. Numbers after the assesment method indicate the site(s) which were used to generate the relevant Bushland Assessment, and an asterisk indicates the modifications were made to the relevant bushland assessment based on noted differences between the site in question and the site(s) used to generate its bushland assessment. A map showing the division of the property into sections is shown in Figure 4.

Site	Block	Section	Area	Perimeter	Benchmark Vegetation Community	Number of internal photopoints	Assessment Method
F1	1	Pioneer	0.98	622	KI 2	None: refer F2	BA (F2/F8)
F2	1	Pioneer	1.43	858	KI 2	1	BA (F2/F8)
F3	1	Pioneer	0.50	392	KI 1.1	None: refer F3-F4 boundary (external photopoint)	BA (F7/F9)
F4	1	Pioneer	0.39	304	KI 1.1	None: refer F3-F4 boundary (external photopoint)	BA (F5/F6)
F5	2	Pioneer	0.90	689	KI 1.1	None: refer F6-F7 boundary	BA (F5/F6)
F6	3	Pioneer	0.46	368	KI 1.1	1	BA (F5/F6)
F7	3	Pioneer	0.70	467	KI 1.1	2	BA (F7/F9)
F8	3	Pioneer	1.66	813	KI 2	1	BA (F2/F8)
F9	3	Pioneer	0.49	409	KI 1.1	None: refer F6-F9 boundary (external photopoint)	BA (F7/F9)
F10	4	Pioneer	3.66	2155	KI 1.1	5	BA
F11	6	Pioneer	7.91	1930	KI 7.2	2	BA (F11/F12)
F12	7	Pioneer	6.78	2129	KI 7.2	2	BA (F11/F12)
F13	8	Pioneer	7.29	1454	KI 7.2	1	BA
F14	8	Pioneer	0.75	408	KI 7.1	None: refer F16 & F17.2	BA (F16*)
F15	9	Pioneer	1.41	585	KI 2	None: refer F16 & F17.2	BA (F16*)
F16	10	Range	1.25	611	KI 7.1	1	BA
F17	11	Range	1.0	509	KI 7.2	2	BA (F17/F18)
F18	12	Range	2.43	1098	KI 7.2	1	BA (F17/F18)
F19	12	Range	2.31	856	KI 3	1	BA
F20	13	Range	0.66	446	KI 2	1	BA
F21	13	Range	7.0	2228	KI 1.1	1	BA
F22	13	Range	2.58	987	KI 7.2	None: refer F24	BA (F24*)
F23	13	Range	5.50	1435	KI 3	2	BA
F24	13	Range	2.63	1045	KI 7.2	1	BA
F25	13	Range	2.72	1297	KI 1.1	2	BA
F26	13	Range	1.64	895	KI 1.1	2	BA
F27	13	Range	0.68	472	KI 1.1	1	BA (F27/F28)
F28	13	Range	0.71	484	KI 1.1	1	BA (F27/F28)
F29	13	Range	0.59	321	KI 1.1	None: refer F47	BA (F47/F29)
F30	17	Pratt	1.69	620	KI 2	1	BA
F31	17	Pratt	0.33	428	KI 1.1	1	BA
F32	18	Pratt	0.44	542	KI 1.1	1	BA
F33	19	Pratt	0.81	712	KI 1.1	1	BA
F34	13	Range	0.70	810	KI 1.1	2	BA

Site	Block	Section	Area	Perimeter	Benchmark Vegetation Community	Number of internal photopoints	Assessment Method
F35	20	Pratt	0.24	213	KI 1.1	1	BA (F36-F37)
F36	21	Pratt	1.55	1114	KI 1.1	1	BA (F36-F37)
F37	22	Pratt	0.93	667	KI 1.1	2	BA (F36-F37*)
F38	23	Pratt	0.78	376	KI 2	1	BA
F39	24	Pratt	1.56	549	KI 1.1	2	BA
F40	25	Pratt	1.15	601	KI 1.1	4	BA
F41	29	Pratt	1.83	1194	KI 1.1	3	BA
F42	27	Pratt	0.83	456	KI 1.1	None: refer C4	BA (C4*)
F43	28	Pratt	3.12	2049	KI 1.1	3	BA
F44	26	Pratt	2.80	733	KI 7.3	2	BA
F45	26	Pratt	1.63	916	KI 1.1	1	BA (F45/F46)
F46	27	Pratt	1.00	741	KI 1.1	2	BA (F45/F46)
F47	13	Range	0.84	583	KI 1.1	1	BA (F47/F29)
		TOTAL AREA	89.24				

BA: Bushland Assessment; Ha: hectares; m: metres.
KI 1.1: Woodlands, low woodlands and mallee with dense sclerophyll shrub understorey
KI 2: Open forests and woodlands with an open sclerophyll shrub understorey
KI 3: Open forests with a sparse shrub and herbaceous undeerstorey
KI 7.1: Riparian woodlands with an open shrub understorey
KI 7.2: Riparian open forests and woodlands with dense shrub understorey
KI 7.3: Freshwater swamp woodlands and low woodlands

6. Assessment outcomes

Vegetation Assessments

General description of the property and its vegetation

The property is located on the edge of the lateritic plateau in the centre-north of Kangaroo Island. The soil is a sandy loam with ironstone gravel, sometimes over clay, on ironstone. A number of creeklines dissect the property.

A number of broad vegetation types occur across the property, the three most common being sugar gum (*Eucalyptus cladocalyx*) forests associated with creek valley slopes, riverine forests dominated by cup gum (*E. cosmophylla*), and stringy bark woodland (with *E. obliqua* generally more common than *E. baxteri*) often on higher ground. *Xanthorrhoea semiplana* occurred in almost every site and *Lepidosperma* spp. were also present in most sites. Some small wetland areas charcaterised by significant *Gahnia trifida*, *Acacia retinodes* and fresh-water wetland shrubs such as *Melaeluca brevifolia*, are also present. Broad vegetation types are mapped in Figure 12 and can be colour-matched to Tables 1-3 which also show the relevant Benchmark Community. More detailed vegetation associations observed at each site are provided in the report sections that deal with the vegetation assessments for sites proposed for clearance and SEB offsetting.

There was significant variation in the quality of the native vegetation assessed, ranging from almost untouched areas to those that had lost much of the understorey through prolonged grazing. Even in some grazed treelines, there were relatively good quality areas where fallen trees or dense vegetation had largely excluded stock from grazing (see Figure 62 for an example). This sometimes occurred patchily within treelines and sometimes more in larger sections of the treeline. This impacted the vegetation assessment method (see Methods).

The relatively high rainfall (>600mm) means that fencing to exclude stock can have quite a big impact on the fenced vegetation and this is illustrated in some supplementary photos (see Figures 63-65 & 67). It also seems to have reduced stock reliance on native vegetation because even in some grazed areas plant diversity and regeneration are still significant (see site C1 proposed for clearance).

In most sites, koala damage was present in specific tree species, and koalas were noted at most sites. In sites containing *E. leucoxylon*, many of those trees were singled out and had been damaged (Figure 69). In sites where *E. cosmophylla* dominated, stringy bark trees had often been singled out and damaged, particularly along creeklines (Figure 57). In one case, a small number of large *E. leucoxylon* in a larger stand of *E. cladocalyx*, had been killed by koalas. Koalas were introduced to Kangaroo Island in a misguided attempt to save some individuals from another island where koalas had been introduced and destroyed their food source. This is unable to be dealt with by the proponents and is not being seriously tackled by the associated government department. There have been previous efforts to limit damage on this property with little success. While it may not impact the calculation of SEB points significantly, the government Excel spreadsheets are erroneous in classifying koalas as native to Kangaroo Island.

The Regionally Endangered Green Carpenter Bee (*Xylocopa aeratus*) was found in a proposed SEB area on the property (Figure 68). It was not able to be considered in the vegetation assessment because it is not present on the Excel list of fauna species. This species is an important native pollinator and an icon for threatened invertebrates; it is extinct from mainland SA and would be more logically classified as Endangered at a State Level.

Protected Matters

The EPBC Protected Matters Search revealed a range of EPBC-listed species that could be associated with areas of native vegetation in the region. These are summarized in Table 4 below, and the full search results are provided near the end of the report.

Protected Fauna

The only EPBC-listed species which was observed was the Kangaroo Island Short-beaked Echidna (*Tachyglossus aculeatus multiaculeatus*). This species occurs widely on Kangaroo Island within, and on the periphery of, remnant native vegetation. This species could potentially occur in most of the remnant vegetation on the property and evidence of digging was fairly widespread. Only two individuals were seen and these were in proposed SEB offset sites F18 (28 May 2019) and H3 (21 Aug 2019) (Figure 71).

Varanus rosenbergi (Heath Goanna) occurs widely on Kangaroo Island and is classified as Vulnerable at a State level. Evidence of digging was found in various sites but no individuals or active burrows were noted. It is possible that it occurs in any of the sites on the property, particularly the larger areas. One state-listed Rare bird, the Bush Stone-curlew, was observed in site F19 which is proposed to be fenced as part of the SEB offset.

As mentioned, evidence of digging by the Short-beaked Echidna and by the Heath Goanna were seen quite often, and these species occur widely on Kangaroo Island and probably widely on this property. With regard to the clearance sites, digging evidence is summarized in Table 5 (no animals were seen).

It is highly likely that areas of good quality vegetation in the area support the Southern Brown Bandicoot. There are three records of this species (all 1990) associated with the large block of remnant vegetation at the NW margin of the property; one is on the margin of the proponent's heritage-listed bushland. It is likely the species also occurs in the proponent's heritage bushland at the east of the property and may be associated with some proposed clearance sites (mainly C1 and C2), and also with numerous areas proposed for heritage listing and/or stock exclusion.

There are no records of the Kangaroo Island Dunnart near the property, however, the trapping effort in the region has been insufficient to exclude it and therefore current absence data lacks integrity. It is possible the species occurs in the larger areas of quality vegetation in the region. Similarly for the Bassian Thrush, there are a lack of records in the region but absence data is unreliable. Further, there are several known sightings in areas not recorded on NatureMaps (not near the proponent's property).

Table 4: Summary of EPBC-listed taxa potentially associated with vegetation proposed for clearance or SEB offseting. The species and its common name are given, along with their relevant National and State classifications and comments about their occurrene or potential occurrence in surveyed areas.

Species	Common Name	National Classification	State Classification	Comments
Calyptorhynchus lathami halmaturinus	Kangaroo Island Glossy Black-Cockatoo	Endangered	Endangered	No evidence seen. Possibly can breed in larger eucalypts which only occurred in proposed SEB areas.
Zoothera lunulata halmaturina	Bassian Thrush (SA subspecies)	Vulnerable	Rare	No evidence seen. Possibly associated with areas of denser vegetation and those with good litter layer (mainly in proposed SEB areas).
Isoodon obesulus obesulus	Southern Brown Bandicoot (south-eastern)	Endangered	Vulnerable	Records from heritage area at west of property. No evidence seen. Probably associated with areas of denser vegetation which mainly occur in larger proposed SEB areas.
Sminthopsis aitkeni	Kangaroo Island Dunnart	Endangered	Endangered	No evidence seen. Possibly associated with areas of denser vegetation which mainly occur in larger proposed SEB areas.
Tachyglossus aculeatus multiaculeatus	Kangaroo Island Short-beaked Echidna	Endangered	-	Occurs in most areas of remnant vegetation on Kangaroo Island. Evidence of digging seen quite commonly. Two individuals observed at proposed offset sites F18 & H3.
Asterolasia phebalioides	Downy Star-bush	Vulnerable	Vulnerable	No records in vicinity. Not seen.
Caladenia tensa	Greencomb Spider-orchid	Endangered	-	No records in vicinity. Not seen.
Cheiranthera volubilis	Twinning Finger-flower	Vulnerable	Vulnerable	No records in vicinity. Not seen. Unlikely to occur.
Leionema equestre	Kangaroo Island Phebalium	Endangered	Endangered	No records in vicinity. Not seen.
Pomaderris halmaturina halmaturina	Kangaroo Island Pomaderris	Vulnerable	Vulnerable	No records in vicinity. Not seen.
Ptilotus beckerianus	Ironstone Mulla Mulla	Vulnerable	Vulnerable	2004 records from roadside vegetation 1km E of property. Not seen but likely to occur somewhere on the property.
Pultenaea villifera glabrescens	Splendid Bush-pea	Vulnerable	Vulnerable	Several historical records within 2km of the property, to the west and northeastt. Not seen but likely to occur somewhere on the property.
Thelymitra matthewsii	Spiral Sun-orchid	Vulnerable	Endangered	Not seen. No records within 20km.
Veronica derwentiana homalodonta	Mount Lofty Speedwell	Critically Endangered	Endangered	Not seen. No records within 50km.

Table 5: Summary of observations of digging by EPBC-listed *Tachyglossus aculeatus multiaculeatus* (Short-beaked Echidna) and State-listed *Varanus rosenbergi* (Heath goanna) at sites proposed for clearance. No indiiduals were noted except for two Echidnas in the proposed SEB sites F18 and H3 (Figure 71). It is likely both species occur in the larger non-grazed sites proposed as SEB offsets.

Site	Echidna digging observed?	Goanna digging observed?
C1	-	Yes
C2	Yes	-
C3	-	-
C4	Yes	Yes
C5	-	-
C6	-	-
C7	-	-
C8	-	-
Scattered Trees	-	-

All of the sites proposed for clearance were either linear (tree lines in farmland) or have been grazed for over 20 years and therefore the chance of their occurrence of the rare small mammals at those sites is relatively reduced (compared to some high quality areas proposed for protection). They are more likely to occur in the larger, non-linear blocks that are proposed as SEB offsets or the large remnant Heritage Agreements at the east and west of the property. However, it cannot be ruled out that these species utilise the more degraded areas, even if not nesting in them, especially if adjacent to larger or higher quality areas of vegetation, which make up a significant area of the property.

There are no records of the Glossy Black-cockatoo in the region and the associated absence data is stronger due to the species being large, not furtive, and known by the local community. It cannot be ruled out that they might utilise larger eucalypts in the area (mostly proposed for protection).

Protected Flora

No EPBC-listed plant communities or species were recorded on the property. Although not observed, it is possible that EPBC-listed plants which are small or annual could have been overlooked. Surveying was conducted at the higher quality, larger clearance sites when such species had a high chance of being present or flowering (early spring). Again, due to grazing, they are more likely to occur in the larger, non-linear blocks that are proposed as SEB offsets or the large remnant Heritage Agreements.

There are two records of the *Ptilotus beckerianus* (Ironstone mulla mulla) from 2004, on each side of Bark Hut Road, 1km E of the property. This indicates that the species occurs on the same soil type as the proponent's property. It is considered likely to occur somewhere on the property, given the significant remnant vegetation it supports, however, it was not detected in the vegetation surveys.

There are several historical records of *Pultenaea villifera glabrescens* (Splendid Bush-pea) within 2km of the property, both in degraded vegetation to the west and higher quality vegetation to the northeast. Therefore, similarly to *P. beckerianus*, the chance of it occurring on the proponent's property should be considered relatively high, although it was not detected in vegetation surveys.

No other listed plants were recorded or had records in the near vicinity (Table 4).

Details of the vegetation associations proposed to be impacted

There are eight vegetation sites and 18 scattered trees (designated as one scattered tree site) to be impacted. One of the sites is largely exotic *Pinus radiata*, previously planted by the proponent. The vegetation to be impacted is shown in Figures 8-11 (native: red; pines: orange).

Due to the large number of sites and photopoints associated with the proposed clearance and offsets, all photopoints are provided separately in Appendix 1. Appendix 2 provides the full Bushland Assessment Scoresheets for the proposed areas of clearance (and SEB offsets).

For each of the vegetation assessment sites proposed for clearance, relevant maps, vegetation descriptions and other specific biological information where appropriate, is provided below.

Table 6 summarises data for the scattered tree assessment including biodiversity scores. Table 11 gives a summary of the biodiversity scores, threatened community/flora/fauna scores, SEB points required, rainfall and other scale factors, and SEB fund payments (including administration cost), for all of the proposed clearance sites.

No Weeds of National Significance were noted.

Block 1: Sites C1 (4.33 Ha) and C2 (3.11Ha)
Figure 13 gives a map for Block 1 showing the all sites (including clearance sites C1 and C2) and photopoints.

Vegetation association C1 (4.33 Ha): *Eucalyptus cosmophylla + E. obliqua + E. baxteri* open forest +/- *E. fasciculosa* +/- *Allocasuarina striata* over X*anthorrhoea semiplana* with complex heath & shrubs

Vegetation association C2 (3.11 Ha): *Eucalyptus fasciculosa* + *E. cosmophylla* open forest +/- *E. baxteri* +/- *E. obliqua* over *Xanthorrhoea semiplana* with complex heath & shrubs

These sites were both logged and burnt in the mid-1980's in order to increase the grazed area of the property. When the Native Vegetation Act was introduced in 1991, they were beyond the 5-year age-limit for clearing native vegetation and were left as areas of native vegetation and have since been open to grazing. Despite this, both sites C1 and C2 received relatively high Unit Biodiversity scores (78.55 and 75.96, respectively). This was largely due to high plant diversity, low weed cover and significant native regeneration due to the high rainfall, despite the obvious grazing pressure and reduction in density of the understorey; see quadrat shots at C1 in Appendix 1. Satellite imagery reveals that both sites have a reduced overstorey compared to the uncleared treelines and heritage area adjacent C1 and C2 (Figure 13).

It is clear that Site C2 has received less grazing pressure compared to C1. This is due to the block being fenced along the western side and a drainage swale under thick vegetation at the southern margin of C2, and heritage remnant on its northern and eastern margins. Therefore, stock need to move through C1 to access C2 and are largely excluded by dense vegetation at the margin of C2. Despite this, C2 received a (slightly) lower Unit Biodiversity Score.

The specific reasons for proposing clearance of these sites are:

- increase the grazing area of the farm (as initiated in the mid-1980s) as the vegetation protrudes into the paddock area;
- reduce native grazing pressure;
- reduce root pressure on existing pasture.

The proponents advise there are no future plans for this site beyond the clearance and offsets proposed in this application.

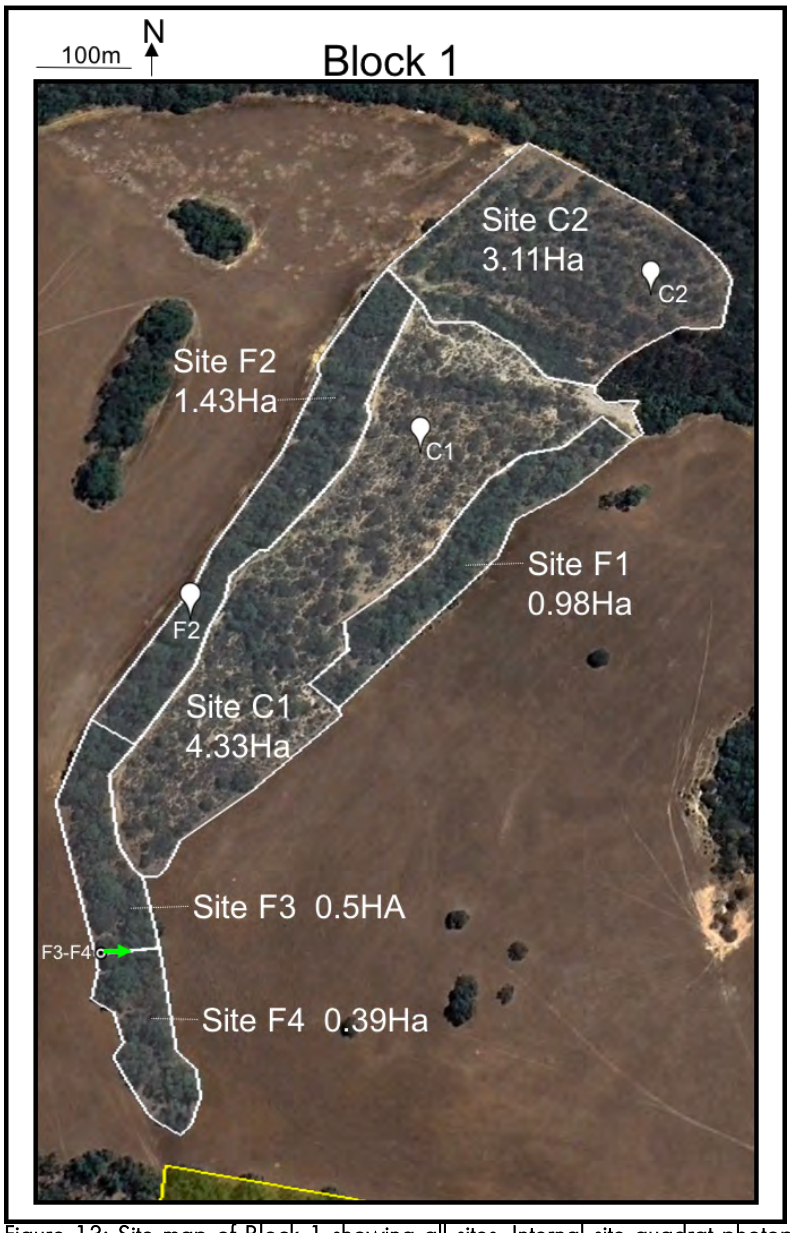


Figure 13: Site map of Block 1 showing all sites. Internal site quadrat photopoints are shown with white drop markers and an external photopoint (F6-F7 boundary) is shown by a small dot with the green arrow indicating the direction of the photo. Waypoint data is as follows: C1: 35.70939°N, 137.23165°E; C2: -35.708182°N, 137.233352°E; F2: -35.71056°N, 137.23011°E; external (F3/F4 boundary) -35.71262°N, 137.22989°E. Site F1 does not have a photopoint but photopoint F2 shows equivalent vegetation. All site photographs are shown in Appendix 1.

Block 4: Site C3 (1.21 Ha)

Figure14 gives a map of Block 4 showing the location of the quadrat photopoints for both associated sites, including clearance site C3.

Vegetation Association C3 (1.21 Ha): *Eucalyptus obliqua* +/- *E. baxteri* +/- *E. cosmophylla* open forest +/- *E. fasciculosa* over *Xanthorrhoea semiplana* over shrubs and sedges

This vegetation occurs along an existing boundary (roadside) fence and the proponent is able to clear a five-metre strip directly adjacent the fence-line under post-2017 legislation. Therefore, this area was not included in the area calculation for this site.

This site received quite a high Unit Biodiversity score of 69.69. This is because despite being open to grazing on one side, the vegetation itself it quite dense and this feature (plus significant fallen wood) has excluded stock from much of the interior of the strip. Thus, much of the original plant diversity of that site has been maintained and there was some regeneration.

The specific reasons for proposing clearance of this site is:

- paddock improvement through reducing area of root impact while maintaining shelter of roadside vegetation;
- reduce fire risk.

The proponents advise there are no future plans for this site beyond the clearance and offsets proposed in this application.

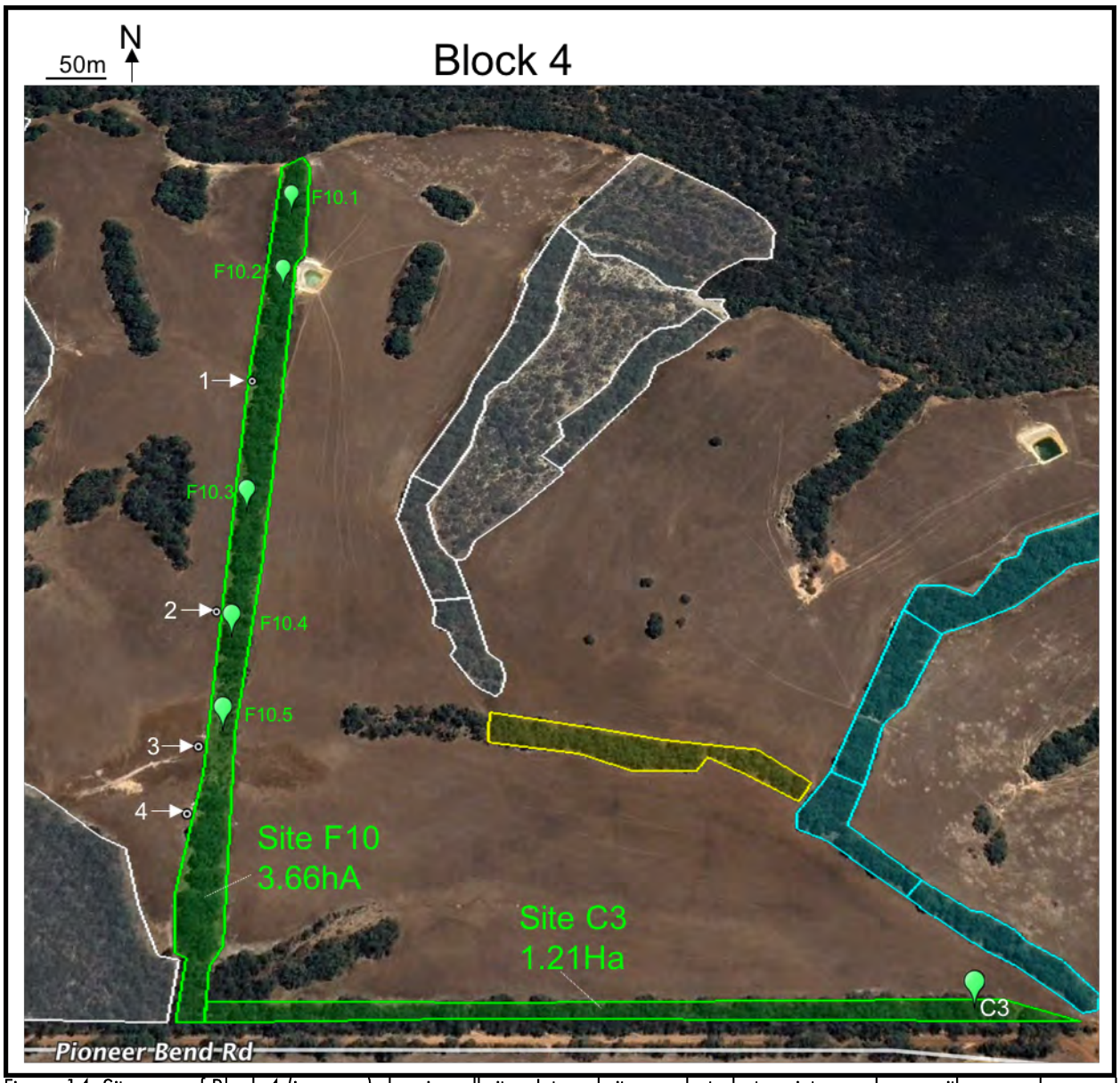


Figure 14: Site map of Block 4 (in green) showing all sites. Internal site quadrat photopoints are shown with green drop markers and are labelled with photpoint IDs (photographs are provided in Appendix 1). Four external photopoints designed to show varioius aspects of site F10, are indicated by small dots with the associated numbered arrows indicating the direction of the photo (see Figure 48 for photos). Waypoint data is as follows: C3: -35.716318°N, 137.235281°E; F10.1: -35.70779°N, 137.22771°E; F10.2: -35.70885°N, 137.22773°E; F10.3: -35.71162°N, 137.22765°E; F10.4: -35.71298°N, 137.22767°E; F10.5: -35.71391°N, 137.22771°E; External 1: -35.71012°N, 137.22752°E; External 2: -35.71276°N, 137.22748°E; External 3: -35.71410°N, 137.22749°E, External 4: -35.71472°N, 137.22747°E.

Block 27: Site C4 (2.00 Ha)
Figure15 gives a map of Block 27 showing the location of the quadrat photopoints for all associated sites, including clearance site C4.

Vegetation Association C4 (2.00 Ha): *Eucalyptus obliqua* + *E. baxteri* +/- *E. cosmophylla* open woodland over *Xanthorrhoea semiplana,* shrubs and pasture weeds

This site received a moderate Unit Biodiversity Score of 56.49. Grazing has heavily impacted this site. While the trees themselves were of average coverage and condition, the understorey plants were much reduced (and aging) with little regeneration and significant pasture weeds in the understorey. This contrasts with a Unit Biodiversity score of 86.82 for the fenced vegetation immediately north of C4, which is proposed as an offset through Heritage Listing. Sites F42 and F46 that occur in the same block and flank site C4 to the west and east, respectively, are proposed as offsets through stock exclusion.

The reason for proposed clearance of this site is to maximise the area of the associated paddock as it is a specialised paddock for the production of clover seed for the grazing operation. The proponents advise there are no future plans for this site beyond the clearance and offsets proposed in this application.

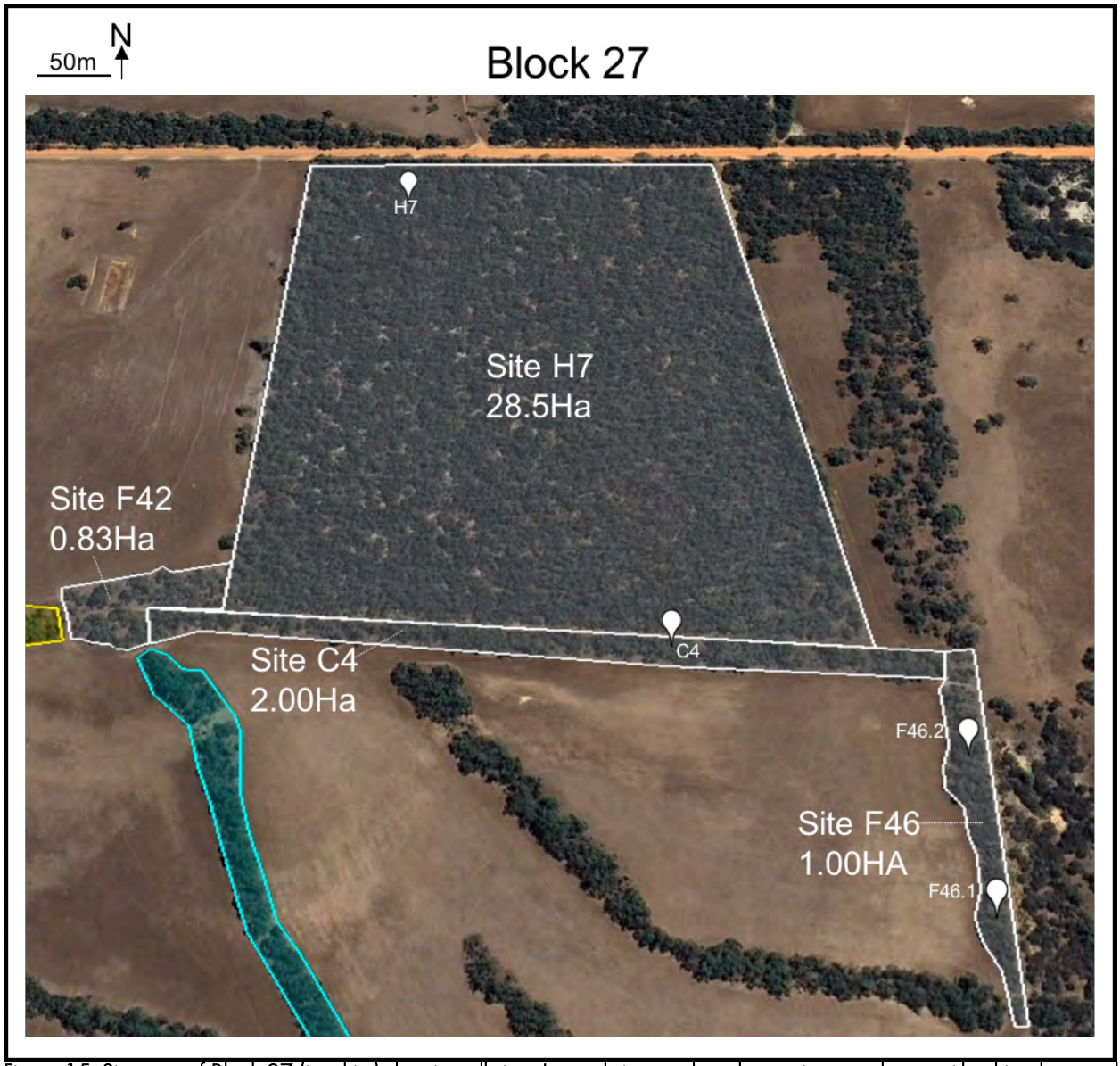


Figure 15: Site map of Block 27 (in white) showing all sites. Internal site quadrat photopoints are shown with white drop markers and are labelled with photpoint IDs (photographs are provided in Appendix 1). A typical example of the effect of grazing and pastue weed introduction in the understorey of F46 is shown in Figure 66. Waypoint data is as follows: C4: -35.681798°N, 137.193442°E; H7: -35.67720°N, 137.19057°E; F46.1: -35.68409°N, 137.19645°E; F46.2: -35.68276°N, 137.19637°E.

Block 14: Site C5 (0.50 Ha)
Figure16 gives a map of Block 14 (corresponding to site C5) showing the location of the quadrat photopoint.

Vegetation Association C5 (0.50 Ha): *Eucalyptus obliqua* +/- *E. baxteri* +/- *E. cosmophylla* open forest over *Xanthorrhoea semiplana* over sparse shrubs

This site received a moderately low Unit Biodiversity Score of 47.11. Grazing has heavily impacted this site and plant diversity was relatively low; it is also a small site. Some areas are inaccessible to stock through fallen wood but there is little vegetation coverage in these areas (but good litter and woody debris coverage).

The reason for proposed clearance of this site (as well as sites C6, C7 and scattered trees) is to improve farm management by opening up a number of very small paddocks to allow access to farm machinery and to improve stock movement in the area. The area currently has significant remnant vegetation, most of which is proposed as SEB offsets. The proponents advise there are no future plans for this site beyond the clearance and offsets proposed in this application.

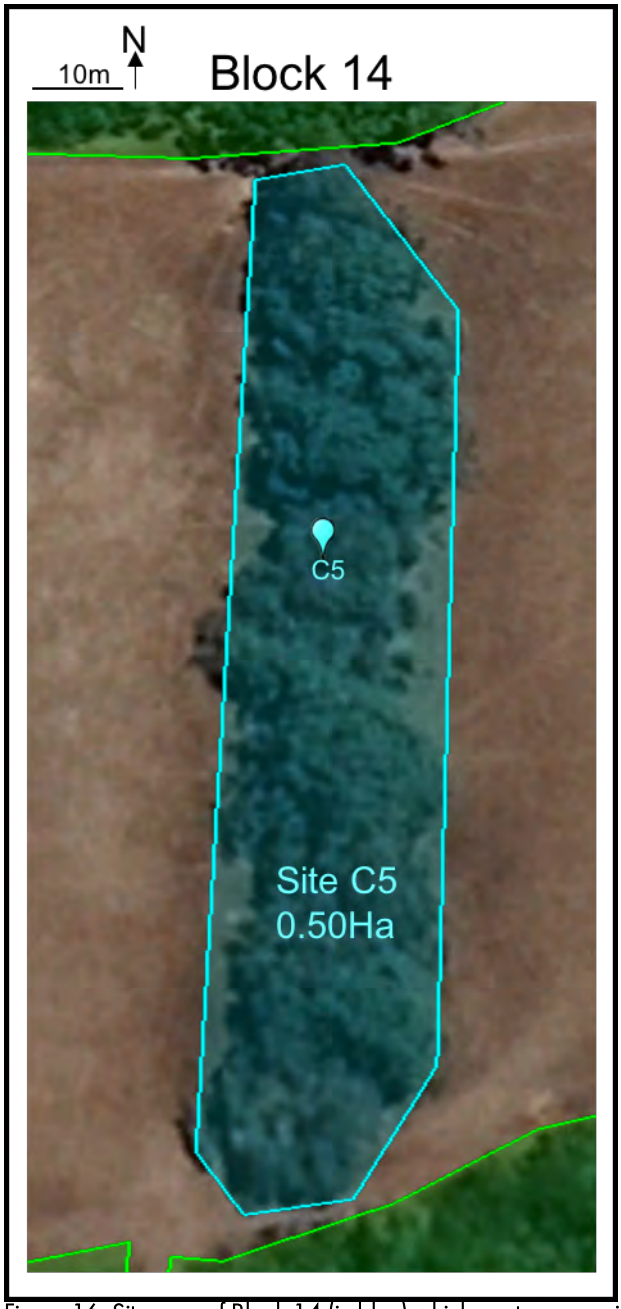


Figure 16: Site map of Block 14 (in blue) which contans one site, C5. The site quadrat photopoint is shown with blue drop markers and are labelled with the photpoint ID (photographs are provided in Appendix 1). Waypoint data is as follows: C5: -35.704218°N, 137.200679°E.

Block 15: Sites C6 (0.66 Ha) and C7 (1.56 Ha)
Figure17 gives a map of Block 15 (comprising sites C6 and C7) showing the location of the quadrat photopoints.

Vegetation Association C6 (0.66 Ha): *Eucalyptus obliqua +/- E. baxteri +/- E. cosmophylla* open forest over *Xanthorrhoea semiplana* over sparse shrubs

Vegetation Association C7 (1.56 Ha): *Pinus radiata* tall closed forest over peripheral *E. cosmophylla,* sparse *Xanthorrhoea semiplana* and pasture weeds

Site C6 has been damaged by grazing and weed introduction (as for many sites) but received a moderately high Unit Biodiversity score of 61.85. This is due to a reasonable proportion of large plant diversity being present, and exclusion of stock in some areas due to fallen wood and/or dense vegetation.

Site C7 is largely exotic *Pinus radiata* with low numbers of *Xanthorrhoea semiplana* in the understorey, and some (≈6) *Eucalyptus cosmophylla* on the periphery (Figure 59). The pines were planted by the family in 1971. This site received a very low Unit Biodiversity score of 5.69 because it had very low biodiversity, is covered with a serious weed, and bears no resemblance to its Benchmark community. See quadrat photos in Appendix 1 and also a peripheral shot of indicative *E. cosmophylla* associated with the site (Figure 59); their position is shown in Figure 17 below.

There is evidence that these pines are becoming weedy in the surrounding native vegetation (much of it proposed as SEB offsets) although numbers are still low. An example is given in the supplementary photographs, later in this report (Figure 52). There was clear evidence of previous control of *P. radiata* on native vegetation, by the proponents. Therefore, despite not making a significant difference to the overall application, the required SEB points are defined but should omitted from the total SEB points required because removal of the pines is a recommended (and expensive) management action that would be proposed as part of managing proposed SEB offsets in the vicinity.

The reason for proposed clearance of these sites (and C5 and scattered trees) is to improve farm management by opening up a number of very small paddocks to allow access to farm machinery and to improve stock movement in the area. The area currently has significant remnant vegetation, most of which is proposed as SEB offsets. The proponents advise there are no future plans for this site beyond the clearance and offsets proposed in this application.

Figure 17: Site map of Block 15 (in white) showing the two associated sites and their quadrat photopoints (white drop markers) which are labelled with the photpoint IDs (photographs are provided in Appendix 1). One external photopoint was establsihed and is indicated by a dot with an arrow showing the direction of the photograph which is shown in Figiure 59. Waypoint data is as follows: C6: -35.70656°N, 137.198740°E; C7: -35.70627°N, 137.199150°E; External: -35.705729°N, 137.199291°E.

Block 16: Site C8 (0.40 Ha)

Figure18 gives a map of Block 16 (comprising only site C8) showing the location of the quadrat photopoint.

Vegetation Association C8 (0.40 Ha): *Eucalyptus cladocalyx* + *E. fasciculosa* + *E. cosmophylla* + *E. leucoxylon* + *E. obliqua* tall open forest over sparse *Xanthorrhoea semiplana.*

This small site consisted of small numbers of large examples of five eucalypts, some *X. semiplana*, and pasture weeds. It received a low Unit Biodiversity score of 35.81 due to the loss of plant diversity. Much of the value of this site came from coverage of mature trees, their hollows, significant fallen wood, and the fact that two occurring plant species (*E. fasciculosa* and *X. semiplana*) were considered Rare at a State level (although are common on Kangaroo Island).

The reason for this proposed clearance is that this patch of vegetation occurs within a paddock that is partially used for irrigated fodder crops, which are crucial for the long-term viability of the grazing operation. The proponents have previously installed irrigation infrastructure that is fed from a dam just south of site C8 and consists of connection points running through the farmland to the north of the dam and reaching the northern edge of the farmland which abuts Range Road. The irrigated area is currently restricted to the east of the line of water connection points and this area is cleared visible to the east of site C8 in Figure 10. The proponents wish to clear site C8 to make full value of the irrigation infrastructure by producing irrigated fodder from the same watering points but encompassing a similar area to the west of the current irrigated area, which would place the current water infrastructure near the centre of a larger irrigated area. The presence of vegetation at site C8 means it is not feasible to manage the associated paddock for irrigated fodder.

The proponents advise there are no future plans for this site beyond the clearance of site C8 and production of irrigated fodder crops in the paddock containing site C8.

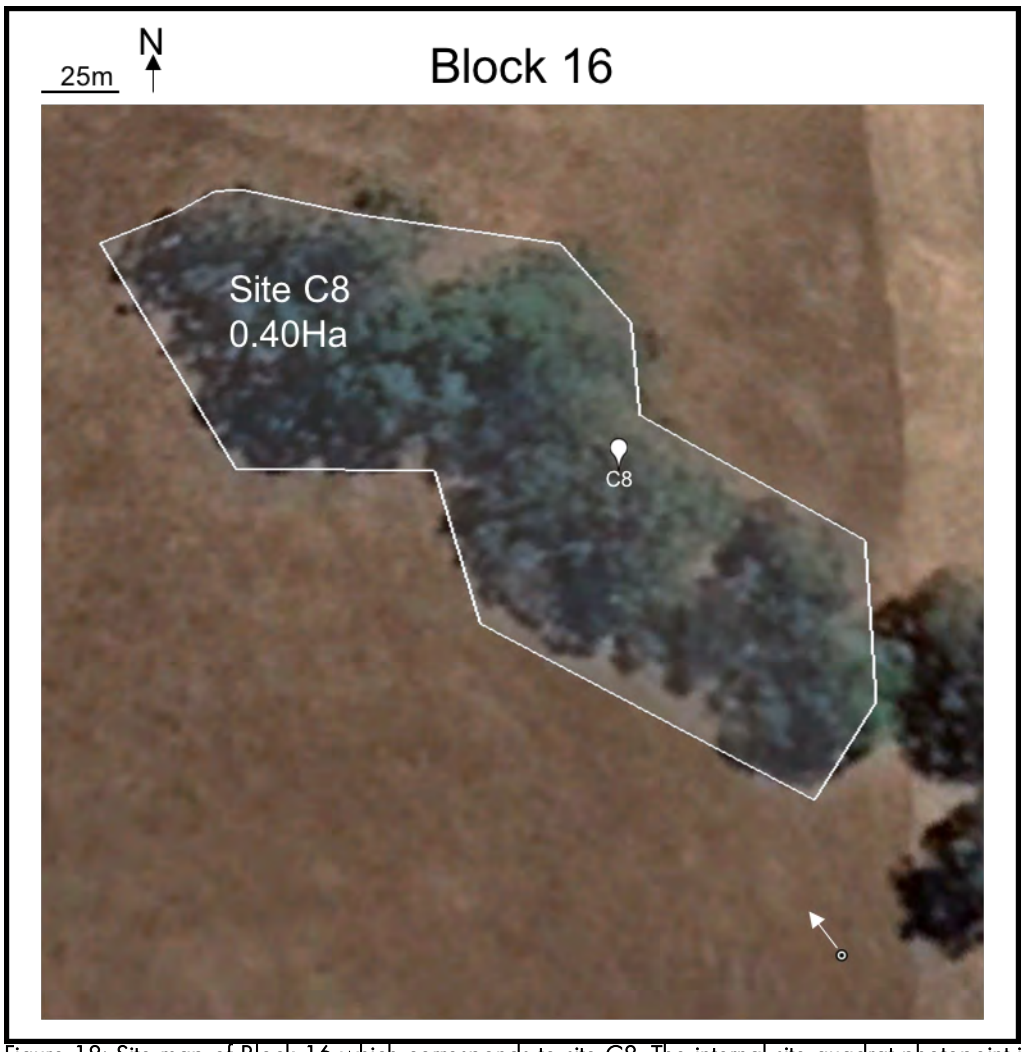


Figure 18: Site map of Block 16 which corresponds to site C8. The internal site quadrat photopoint is shown with a white drop marker and is labelled with photpoint ID (photographs are provided in Appendix 1). One external photopoint is indicated with a dot with the associated arrow indicating the direction of the photo, which is shown in Figure 60. Waypoint data is as follows: C8: -35.70017°N, 137.20362°E; External (dot): -35.70072°N, 137.203860°E.

Scattered Trees (18 trees)

Figure 19 shows the scattered tree assessment site with each tree numbered. There were 18 trees in total, arranged as five patches and six single trees (see Table 4). Figures 20a and 20b (separate panels) show photographs of trees 1-11 and 12-18, respectively, in their constituent patches where appropriate. Being relatively isolated and heavily grazed beneath, the trees were not considered to be a significant habitat for EPBC-listed species, some of which occur in the area. Two possible exceptions to this, are *Varanus rosenbergi* (Heath Goanna) and *Tachyglossus aculeatus multiaculeatus* (Short-beaked Echidna), which could potentially nest in almost any undisturbed habitat including in open ground. The trees were inspected for evidence of these species but none was found.

The reasons for the proposed clearance of the isolated trees are:

- improve the paddock productivity by reducing root competition from the isolated trees
- the proponents wish to utilise this paddock for fodder crops in the future, however, the trees that protrude into the paddock would inhibit machinery access along the southern margin of the paddock.

The proponents advise that there are no future plans for the site other than the clearance, offsets and use of the paddock for fodder crops, as set out in this application.

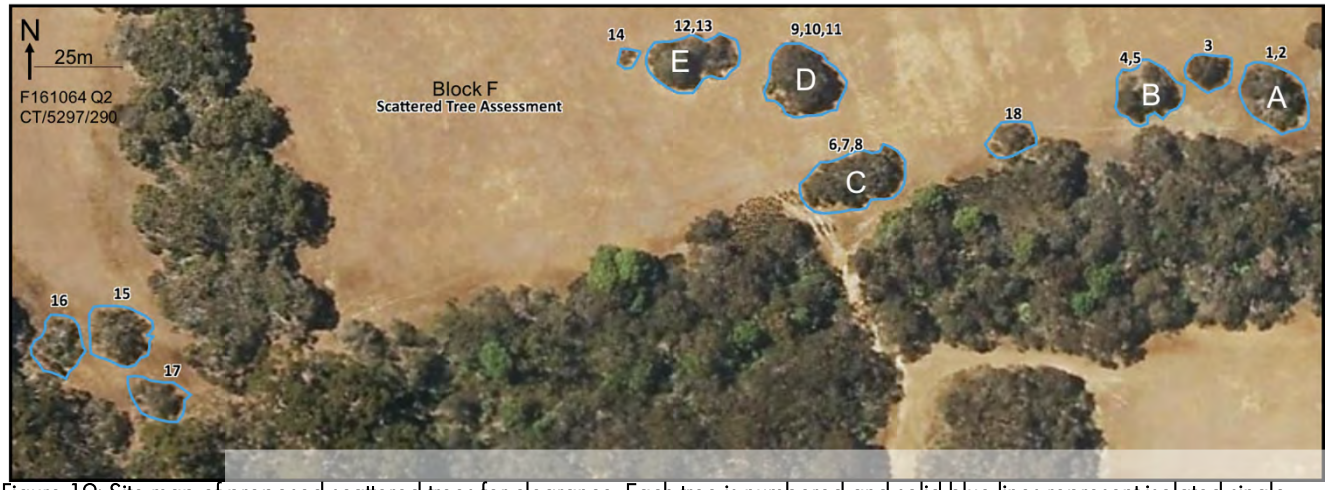


Figure 19: Site map of proposed scattered trees for clearance. Each tree is numbered and solid blue lines represent isolated single trees or patches (patch IDs are shown as white letters within blue boundaries). All numbered trees are *Eucalyptus cosmophylla* which also dominate the adjacent vegetated swale to the south. Section/Allotment and Certificiate of Title numbers are shown.

Figure 20a: Photographs of trees 1-11 assessed as part of the scattered tree asessement. Where trees occur in patches (clumps), the patch ID is given. All numbered trees are *Eucalyptus cosmophylla* which also dominate the adjacent vegetated swale to the south in the background of the photographs. Figure 19 shows an aerial view of the trees/patches and Table 4 summarises species, GPS data, total tree scores and SEB points required for offset of each tree.

Figure 20b: Photographs of trees 12-18 assessed as part of the scattered tree asessement. Where trees occur in patches (clumps), the patch ID is given. All numbered trees are *Eucalyptus cosmophylla* which also dominate the adjacent vegetated swale to the south in the background of the photographs. Figure 18 shows an aerial view of the trees/patches and Table 4 summarises species, GPS data, total tree score and SEB points required for offset of each tree.

Table 6. Scattered tree assessment summary showing tree-patch association, species, GPS data, tree scores and SEB points required for offset.

Tree number	Patch ID	Species	Latitude	Longitude	Total Tree Score	SEB Points Required
1	A	*Eucalyptus cosmophylla*	-35.707280°N	137.198240°E	6.66	6.99
2		*Eucalyptus cosmophylla*	-35.707280°N	137.198240°E	5.79	6.08
3	single tree	*Eucalyptus cosmophylla*	-35.707330°N	137.198120°E	1.91	2.01
4	B	*Eucalyptus cosmophylla*	-35.707340°N	137.197880°E	3.32	3.49
5		*Eucalyptus cosmophylla*	-35.707340°N	137.197880°E	3.01	3.16
6	C	*Eucalyptus cosmophylla*	-35.707550°N	137.197050°E	3.01	3.16
7		*Eucalyptus cosmophylla*	-35.707550°N	137.197050°E	3.01	3.16
8		*Eucalyptus cosmophylla*	-35.707550°N	137.197050°E	3.32	3.49
9	D	*Eucalyptus cosmophylla*	-35.707300°N	137.196900°E	3.32	3.49
10		*Eucalyptus cosmophylla*	-35.707300°N	137.196900°E	3.32	3.49
11		*Eucalyptus cosmophylla*	-35.707300°N	137.196900°E	3.89	4.08
12	E	*Eucalyptus cosmophylla*	-35.707250°N	137.196560°E	1.91	2.01
13		*Eucalyptus cosmophylla*	-35.707250°N	137.196560°E	3.89	4.08
14	single tree	*Eucalyptus cosmophylla*	-35.707290°N	137.196370°E	0.95	1.00
15	single tree	*Eucalyptus cosmophylla*	-35.707910°N	137.194820°E	3.32	3.49
16	single tree	*Eucalyptus cosmophylla*	-35.707930°N	137.194680°E	1.91	2.01
17	single tree	*Eucalyptus cosmophylla*	-35.708100°N	137.194960°E	3.66	3.84
18	single tree	*Eucalyptus cosmophylla*	-35.707470°N	137.197490°E	3.32	3.49
				TOTALS	59.52	62.54

Presence of Substantially Intact Vegetation

Assessment against intact vegetation stratum criteria.

None of the sites proposed for clearance strictly satisfies all criteria for representing an intact stratum. Site C3 was considered to be borderline. Considerations and a recommendation for site are as follows:

Site C1 (Figure 13): cleared (≈35 year-old re-growth), heavily grazed with good plant diversity but all strata impacted. Impact visible from satellite imagery of adjacent vegetation. **Recommendation: site C1 not intact stratum.**

Site C2 (Figure 13): cleared (≈35 year-old re-growth), grazed with good plant diversity but all strata impacted. Impact visible from satellite imagery of adjacent vegetation. **Recommendation: site C2 not intact stratum.**

Site C3 (Figure 14): remnant with lightly damaged understory but good diversity, trees are at pre-European density and diversity, but are part of linear vegetation ≈30m that is close to (but not truly contiguous with) larger vegetated areas. Therefore, overstorey is borderline intact but not strictly intact. **Recommendation: site C3 borderline; intact in itself but not strictly contiguous.**

Site C4 (Figure 15): remnant with damaged understory, trees below pre-European density (and perhaps diversity). **Recommendation: site C4 not intact stratum.**

Site C5 (Figure 16): remnant with damaged understory, trees slightly below pre-European density, close but not contiguous with large vegetated areas. **Recommendation: site C5 not intact stratum.**

Site C6 (Figure 17): remnant with damaged understory, trees slightly below pre-European density, close but not contiguous with vegetated areas that are linear (paddock/creek tree-lines). **Recommendation: site C6 not intact stratum.**

Site C7 (Figure 17): no intact stratum, mostly covered with perennial exotic weeds. **Recommendation: site C7 not intact stratum.**

Site C8 (Figure 18): only significant stratum is trees which are a little below pre-European density but hard to tell due to being very old vegetation. Occurs as an isolated patch of 0.40 Ha. **Recommendation: site C8 not intact stratum.**

Scattered trees over pasture are defined as not representing an intact stratum.

Damage in Previous 20 Years.

Vegetation at all sites proposed for clearance have been damaged through human-induced activity in the previous 20 years, to various degrees. All sites have been grazed leading to accumulative damage to the understorey. In most other sites the overstorey has been damaged through ongoing edge effects associated with farming and exposure.

Principles of Clearance (Schedule 1, *Native Vegetation Act 1991*)

Principle a) comprising a high level of plant diversity.

Table 7 summarises the considerations, moderating factors and recommended degree of variance with the Act for plant diversity, for all sites proposed for clearance.

Table 7: Summary of assessment of proposed clearance sites as supporting a high level of plant diversity. Plant diversity metrcis, basal degree of variance, moderating factors and the recommdened degree of variaince for all sites proposed for clearance. Note that errors in the Excel spreadsheets (where some weeds are counted as native) could have changed the Basal Degree of Variance for sites C3 and C5.

Site	Relevant Metrics	Basal Degree of Variance	Moderating Factors	Recommended Degree of Variance
C1	No. of native plant species less herbaceous annuals: 42 Plant Diversity Score: 28	Seriously At Variance	Small scale clearance compared to local remnancy	Seriously At Variance
C2	No. of native plant species less herbaceous annuals: 46 Plant Diversity Score: 30	Seriously At Variance	Small scale clearance compared to local remnancy	Seriously At Variance
C3	No. of native plant species less herbaceous annuals: 25 Plant Diversity Score: 22	Seriously At Variance	• Small scale clearance compared to local remnancy • Excel sheet error counting 3 weeds as native	At Variance
C4	No. of native plant species less herbaceous annuals: 25 Plant Diversity Score: 18	At Variance	Small scale clearance compared to local remnancy	Not At Variance
C5	No. of native plant species less herbaceous annuals: 13 Plant Diversity Score: 10	At Variance	• Small scale clearance compared to local remnancy • Excel sheet error counting 5 weeds as native	Not At Variance
C6	No. of native plant species less herbaceous annuals: 25 Plant Diversity Score: 18	At Variance	Small scale clearance compared to local remnancy	Not At Variance
C7	No. of native plant species less herbaceous annuals: 4 Plant Diversity Score: 2	Not At Variance	n/a	Not At Variance
C8	No. of native plant species less herbaceous annuals: 8 Plant Diversity Score: 6	Not At Variance	n/a	Not At Variance
scattered trees	n/a	n/a	n/a	n/a

n/a: not applicable

Principle b) having significance as a habitat for wildlife.

Table 8 summarises the considerations, moderating factors and recommended degree of variance with the Act, for wildlife habitat significance. Note that this does not consider invertebrates which comprise approximately 95% of terrestrial fauna species.

Table 8: Summary of assessment of proposed clearance sites as being a habitat of significance for wildlife. Wildlife habitat significance metrcis, basal degree of variance, moderating factors and the recommdened degree of variaince for all sites proposed for clearance.

Site	Relevant Metrics	Basal Degree of Variance	Moderating Factors	Recommended Degree of Variance
C1	Threatened Fauna Score: 0.1 Unit Biodiversity Score: 78.55	Seriously At Variance	• not significant impact • some potential listed fauna species locally common • non-essential habitat	At variance
C2	Threatened Fauna Score: 0.1 Unit Biodiversity Score: 75.96	Seriously At Variance	• not significant impact • some potential listed fauna species locally common • non-essential habitat	At variance
C3	Threatened Fauna Score: 0.1 Unit Biodiversity Score: 69.69	Seriously At Variance	• not significant impact • some potential listed fauna species locally common • non-essential habitat	At variance
C4	Threatened Fauna Score: 0.1 Unit Biodiversity Score: 56.49	Seriously At Variance	• not significant impact • some potential listed fauna species locally common • non-essential habitat	At variance
C5	Threatened Fauna Score: 0.1 Unit Biodiversity Score: 23.56	Seriously At Variance	• not significant impact • some potential listed fauna species locally common • non-essential habitat	At variance
C6	Threatened Fauna Score: 0.1 Unit Biodiversity Score: 61.85	Seriously At Variance	• not significant impact • some potential listed fauna species locally common • non-essential habitat	At variance
C7	Threatened Fauna Score: 0.1 Unit Biodiversity Score: 8.88	Seriously At Variance	• not significant impact • listed fauna species locally common • significant benefit for the two listed species • non-essential habitat	At variance
C8	Threatened Fauna Score: 0.1 Unit Biodiversity Score: 35.81	Seriously At Variance	• not significant impact • listed fauna species locally common • significant benefit for the two listed species for which site is potential habitat • non-essential habitat	At variance
scattered trees	Not habitat for threatened fauna	Not at variance	n/a	Not at variance

n/a: not applicable

Principle c) supporting plants of a rare, vulnerable or endangered species.

Table 9 summarises the considerations, moderating factors and recommended degree of variance with the Act, for supporting listed fauna species.

Table 9: Summary of assessment of proposed clearance sites as supporting listed fauna species. Listed fauna metrcis, basal degree of variance, moderating factors and the recommdened degree of variaince for all sites proposed for clearance.

Site	Relevant Metrics	Basal Degree of Variance	Moderating Factors	Recommended Degree of Variance
C1	Threatened Flora Score: 0.8	Seriously At Variance	• not significant impact • low number of plants cleared	At variance
C2	Threatened Flora Score: 0.8	Seriously At Variance	• not significant impact • low number of plants cleared	At variance
C3	Threatened Flora Score: 0.8	Seriously At Variance	• not significant impact • low number of plants cleared	At variance
C4	Threatened Flora Score: 0.4	At Variance	• not significant impact • low number of plants cleared	At variance
C5	Threatened Flora Score: 0.8	Seriously At Variance	• not significant impact • low number of plants cleared	At variance
C6	Threatened Flora Score: 0.4	At Variance	• not significant impact • low number of plants cleared	At variance
C7	Threatened Flora Score: 0.4	At Variance	• not significant impact on one locally common species • very low number of plants cleared	Not At Variance
C8	Threatened Flora Score: 0.4	At Variance	• not significant impact • very low number of plants cleared	Not At Variance
scattered trees	Not a threatened flora species	Not at variance	n/a	Not at variance

n/a: not applicable

Principle d) comprising the whole, or a part, of a plant community that is rare, vulnerable or endangered.

None of the vegetation association of the proposed clearance sites represent as Rare, Vulnerable or Endangered plant community. The associated vegetation associations are generally common within the Parndana IBRA Association and the lateritic plateau more generally.

Therefore, for all sites, it is recommended that the degree of variation with the Act for comprising a listed plant community, should be *Not at Variance*.

Principle e) having significance as a remnant of vegetation in an area which has been extensively cleared.

Table 10 summarises the considerations, moderating factors and recommended degree of variance with the Act, for being significant as a remnant in the IBRA-subregion and IBRA-association.

Table 10: Summary of assessment of proposed clearance sites as being a habitat of significance as a remnant of vegetation in an extensively cleared area. Wildlife habitat significance metrcis, basal degree of variance, moderating factors and the recommdened degree of variaince for all sites proposed for clearance.

Site	Relevant Metrics	Basal Degree of Variance	Moderating Factors	Recommended Degree of Variance
C1	• IBRA sub-region remnancy: ≈40% • IBRA association remnancy: 52% • Total Biodiversity Score: 340.12	At Variance	Will continue to degrade in future	Not At Variance
C2	• IBRA sub-region remnancy: ≈40% • IBRA association remnancy: 52% • Total Biodiversity Score: 236.24	At Variance	None	At variance
C3	• IBRA sub-region remnancy: ≈40% • IBRA association remnancy: 52% • Total Biodiversity Score: 84.33	At Variance	Will continue to degrade in future	Not At Variance
C4	• IBRA sub-region remnancy: ≈40% • IBRA association remnancy: 52% • Total Biodiversity Score: 112.98	At Variance	Poor condition and will continue to degrade in future	Not At Variance
C5	• IBRA sub-region remnancy: ≈40% • IBRA association remnancy: 52% • Total Biodiversity Score: 23.56	Not At Variance	n/a	Not At Variance
C6	• IBRA sub-region remnancy: ≈40% • IBRA association remnancy: 52% • Total Biodiversity Score: 40.82	Not At Variance	n/a	Not At Variance
C7	• IBRA sub-region remnancy: ≈40% • IBRA association remnancy: 52% • Total Biodiversity Score: 8.88	Not At Variance	n/a	Not At Variance
C8	• IBRA sub-region remnancy: ≈40% • IBRA association remnancy: 52% • Total Biodiversity Score: 14.33	Not At Variance	n/a	Not At Variance
scattered trees	• IBRA sub-region remnancy: ≈40% • IBRA association remnancy: 52% • Total Biodiversity Score: 59.52	Not at variance	n/a	Not At variance

n/a: not applicable

Principle f) growing on, or associated with, a wetland environment.

None of the sites proposed for clearance are associated with a wetland environment and it is **recommended that all sites should be Not At Variance for this principle.**

Principle g) contributing significantly to the amenity of the area in which it is growing or is situated.

The following points were addressed:

- the area proposed to be cleared is a relatively small amount on a large property with significant remnant vegetation including two large Heritage Agreements and significant creek lines fenced,
- hardly any of the vegetation to be cleared is visible from roadsides,
- there are no cultural or historic values to the vegetation. Much of the local community is associated with farming and are unlikely to object to such a proposal,
- there are no *Eucalyptus camaldulensis* and clearance is largely restricted to smaller trees, except site C8 which is only 0.4 Ha,
- the overstorey in some of the tree-lines proposed for clearance area is subject to dieback.

Therefore, for all sites, it is recommended that the degree of variation with the Act for contributing significantly to amenity of the area, should be *Not at Variance*.

Principles of Clearance (h-m).

These principles will to be considered subsequently by comments provided by the local NRM Board or relevant Minister. The Data Report contains information on these principles where relevant and where sufficient information or expertise is available.

Principle h) Soil Erosion and Salinity
I consider that the proposed clearance will not alter these factors at any site because it generally does not occur in wet areas and will be managed as pasture or fodder crops.

Principle i) Quality of Surface or Underground Water
I consider that the proposed clearance should not affect quality of surface or ground water. There may be increased irrigation in of a small area however the scale is insignificant at a water catchment level.

Principle j) Incidence and Intensity of Flooding
It is unlikely the proposed clearance will alter flooding characteristics as it is not generally associated with areas of drainage and cleared areas will be managed as pasture or fodder crops.

Principle k) Considerations of Clearance and Subsequent Land Use with Regard to NRM Act and NRM Board/Plan Parameters
Land use will not be altered. Grazing/fodder production will be increased but insignificantly compared to the overall scale of these activities on the property and wider area.

Principle l) Significant Harm to River Murray as per River Murray Act 2003
Not applicable here.

Principle m) Significant Harm to Adelaide Dolphin Sanctuary
Not applicable here.

Assessment Against the Mitigation Hierarchy

The areas of vegetation proposed for clearance have been specifically targeted to certain production and management outcomes aimed at the long-term sustainability of the grazing operation. These outcomes (reasons for clearing) are discussed for each site in the discussions relating to the vegetation assessments for the sites. To achieve these outcomes the targeted vegetation needs to be cleared completely and therefore avoidance or partial rehabilitation of the cleared areas is not possible.

A small amount of minimisation was identified by inspecting maps of the assessed vegetation and making small reductions where possible (for example, areas where a site to be cleared abutted other vegetation which would remain (effectively adding to the area remaining after clearance).

In order to achieve an overall positive outcome for the native vegetation on the property it was decided to take a holistic approach whereby a whole of farm plan was produced for clearing and offsetting the clearance on-farm. This would be linked to Bushland Assessment data that allows assessment of most of the associated metrics for large number of sites over time. Key aims of taking this approach are:

- partial SEB offsets would be provided over a significant span of the property in the form of both new/additive Heritage Agreements on high-value fenced vegetation
- partial SEB offsets would be provided by fencing remnant vegetation over a significant span of the property to exclude stock
- the total SEB offsets would cover significantly more area than the cleared vegetation
- the total SEB offsets would exceed the cleared area in terms of SEB points
- all SEB offsets would occur on-farm and be the responsibility of the proponents to deliver as part of their long-term farm management plans
- a large number of (four-way) photopoints would be established, and in some cases multiple photopoints established in single sites, to allow assessment of variation in current sites and allow significant future comparisons across the property
- separate Bushland Assessments would be conducted on most sites to give a fine resolution of metrics associated with management outcomes (e.g. weed coverage) across a large number of sites
- Bushland Assessments would be produced to reflect variation in structural differences (e.g. litter coverage) in sites of similar vegetation type, also allowing these metrics to be assessed over time for a large number of sites
- other native revegetation will be undertaken in the more highly cleared areas of the farm, in accordance with advice from local DEW staff, above and beyond the SEB offsets set out in this report. This is already underway at the proponent's expense.

As stated earlier, the proponent advises that no further clearance is expected on the property beyond what is part of this application.

Significant Environmental Benefit Calculation

Determination of the SEB offset

Clearance Area and Payment Metrics

Table 11. Summary of area, threatened community/flora/fuana scores, unit/total diversity scores, scale factors, SEB points required and equivalent payments, for all sites proposed for clearance. There are nine sites in total, one of which consists of scattered trees.

Block	Site	Area (Ha)	Threatened Ecological Community / Ecosystem score	Threatened Flora score	Threatened Fauna score	Unit Biodiversity Score	Total Biodiversity Score	SEB Points Required	Rainfall Factor (mm)	Economy of Scale Factor	Fund Payment (Ex GST)	Administration Cost (Inc GST)
1	C1	4.33	1.0	0.08	0.1	78.55	340.12	357.13	610	0.35	$198,289.78	$10,905.94
1	C2	3.11	1.0	0.08	0.1	75.96	236.24	248.06	610	0.35	$137,729.00	$7,575.09
4	C3	1.21	1.0	0.08	0.1	69.69	84.33	88.55	622	0.35	$50,130.80	$2,757.19
27	C4	2.00	1.0	0.04	0.1	56.49	112.98	118.63	642	0.35	$69,324.53	$3,812.85
14	C5	0.50	1.0	0.08	0.1	47.11	23.56	24.73	643	0.35	$14,476.27	$796.19
15	C6	0.66	1.0	0.04	0.1	61.85	40.82	42.87	651	0.35	$25,400.05	$1,397.00
15	C7*	1.56	1.0	0.04	0.1	5.69	8.88	9.32	650	0.35	$5,513.74	$303.26
16	C8	0.40	1.0	0.04	0.1	35.81	14.33	15.04	639	0.35	$8,748.59	$481.17
ST	ST	18 trees	n/a	n/a	n/a	n/a	59.52	62.54	650	n/a	$50,816.07	$2,540.80

*largely exotic planted vegetation dominated by *Pinus radiata*. Recommendation to exempt clearance from offset as would benefit other native vegetation to be conserved in the area.
ST: scattered trees; n/a: not applicable; Ha: hectares; mm: millimetres; Inc: including; Ex: excluding; GST: goods and services tax.

Method of achieving an SEB

The SEB will be achieved by:

☒ Establish a new SEB Area on land owned by the proponent.
☐ Use SEB Credit that the proponent has established. Provide the SEB Credit Ref. No. _____
☐ Apply to have SEB Credit assigned from another person or body. The application form needs to be submitted with this Data Report.
☐ Apply to have an SEB to be delivered by a Third Party. The application form needs to be submitted with this Data Report.
☐ Pay into the Native Vegetation Fund

SEB Offset Sites

As set out in the methods, Tables 2 & 3, and in Figures 8-11(yellow & blue sites), the sites chosen for offsetting the proposed clearance are divided into two categories based on their management history and the different ways they will be used for offsetting, *viz*:

1. previously fenced native vegetation from which stock has been excluded will be placed under Heritage Agreements, either adding to several existing agreements or under new agreements (Table 2; 15 sites);

2. native vegetation currently fenced on one side only, will be completely fenced to exclude stock (Table 3; 47 sites).

Bushland assessments were carried out for offset sites in the same way as for sites proposed for clearance.

Maps of vegetation blocks containing proposed SEB sites and their vegetation associations

Blocks 1,4 and 27 (shown earlier)
Relevant blocks that have not been shown earlier will be presented in numeric order. Some SEB-associated blocks were shown earlier due to also having proposed clearance sites associated with them (blocks 1,4 and 27 shown in Figures 13, 14 and 15, respectively). SEB sites associated with these three blocks include F1-F4 (block 1), F10 (block 4), and H7, F42 and F46 (block 27). Some blocks (shown earlier) are only associated with sites proposed for clearance.

Vegetation associations for these sites are:

Vegetation association F1 (0.98 Ha): *Eucalyptus cosmophylla* + *E. obliqua* + *E. baxteri* open forest +/- *E. fasciculosa* +/- *Allocasuarina striata* over *Xanthorrhoea semiplana* with shrubs and sedges

Vegetation association F2 (1.43 Ha): *Eucalyptus cosmophylla* + *E. obliqua* + *E. baxteri* open forest +/- *E. fasciculosa* +/- *Allocasuarina striata* over *Xanthorrhoea semiplana* with shrubs and sedges

Vegetation association F3 (0.50 Ha): *Eucalyptus obliqua* +/- *E. baxteri* +/- *E. cosmophylla* open forest +/- *E. fasciculosa* over *Xanthorrhoea semiplana* with shrubs and sedges

Vegetation association F4 (0.39 Ha): *Eucalyptus obliqua* +/- *E. baxteri* +/- *E. cosmophylla* open forest +/- *E. fasciculosa* over *Xanthorrhoea semiplana* with sparse shrubs and sedges with significant pasture weeds

Vegetation association F10 (3.66 Ha): *Eucalyptus obliqua* +/- *E. baxteri* +/- *E. cosmophylla* open forest +/- *E. fasciculosa* over *Xanthorrhoea semiplana* with sparse shrubs and sedges with pasture weeds

Vegetation association F42 (0.83 Ha): *Eucalyptus obliqua* + *E. baxteri* +/- *E. cosmophylla* open woodland over *Xanthorrhoea semiplana,* shrubs and pasture weeds

Vegetation association F46 (1.00 Ha): *Eucalyptus obliqua* +/- *E. baxteri* +/- *E. cosmophylla* open forest over *Xanthorrhoea semiplana,* sparse shrubs, edges with pasture weeds

Vegetation association H7 (28.5 Ha): *Eucalyptus obliqua* + *E. baxteri* +/- *E. cosmophylla* open woodland +/- *Allocasuarina striata* over *Xanthorrhoea semiplana* with complex heath and shrubs

Block 2

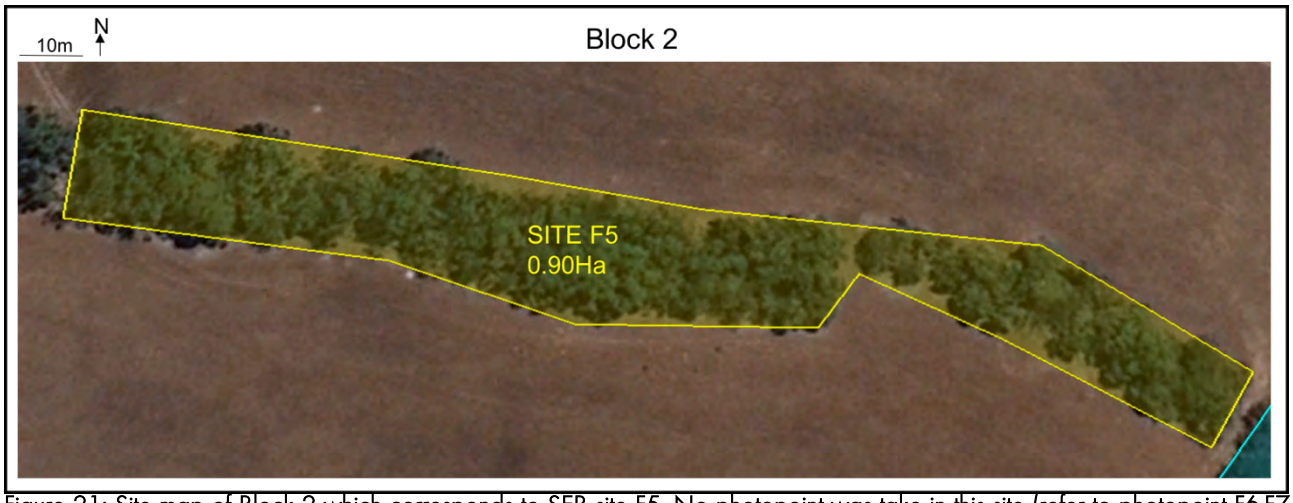


Figure 21: Site map of Block 2 which corresponds to SEB site F5. No photopoint was take in this site (refer to photopoint F6-F7 boundary and also external photopoint at F6-F9 boundary for similar vegetation).

Vegetation association F5 (0.90 Ha): *Eucalyptus obliqua* +/- *E. baxteri* +/- *E. cosmophylla* open forest +/- *E. fasciculosa* over *Xanthorrhoea semiplana* with sparse shrubs and sedges with significant pasture weeds

Block 3

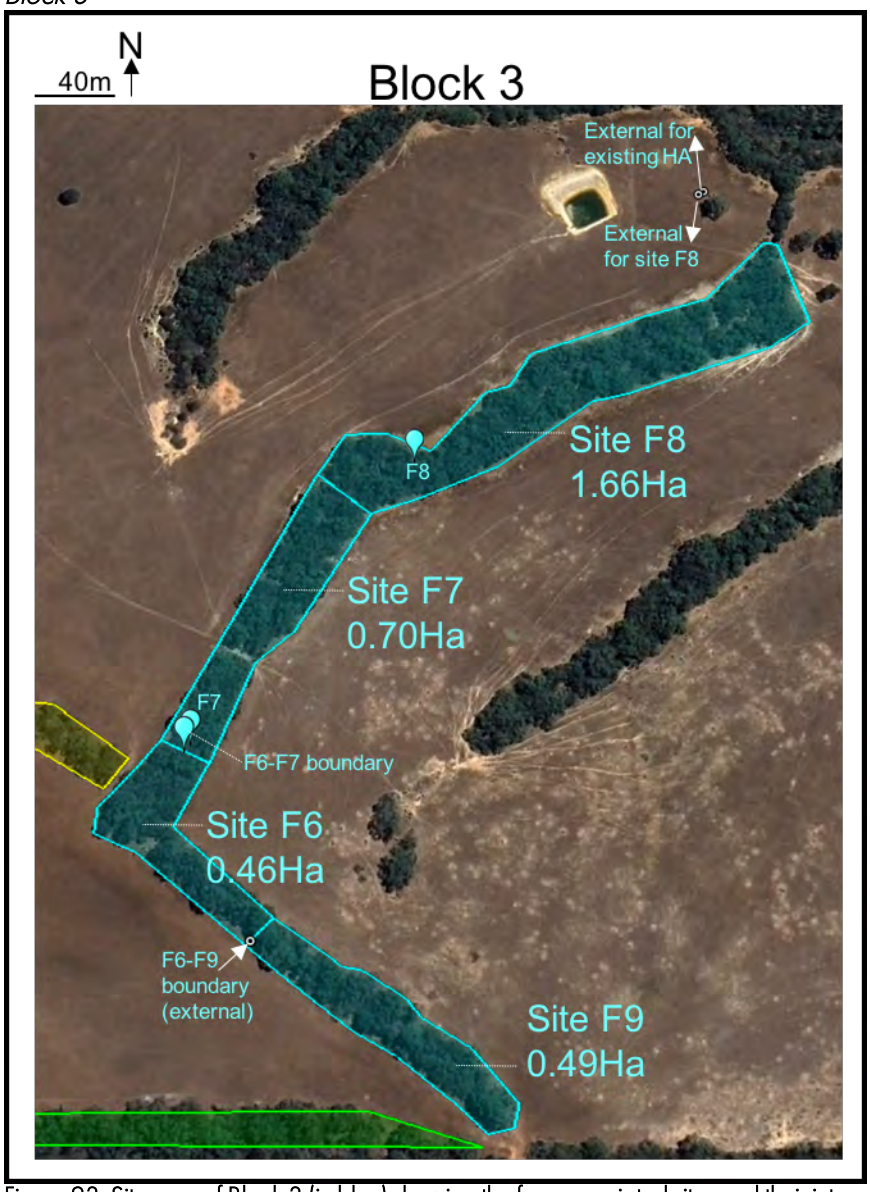


Figure 23: Site map of Block 3 (in blue) showing the four associated sites and their internal quadrat photopoints (blue drop markers) which are labelled with the photpoint IDs (photographs are provided in Appendix 1). Three external photopoints were also establsihed and are indicated by dots with an arrow showing the direction of the photographs (shown in Figure 47). Waypoint data is as follows: F6-F7 boundary: -35.71436°N, 137.23426°E; F7: -35.71432°N, 137.23430°E; F8: -35.712620°N, 137.23575°E; external F6-F9 boundary: -35.71540°N, 137.23478°E; external for site F8: -35.710810°N, 137.23785°E, extenal for equivalent existing heritage Agreement (HA): -35.71079°N, 137.23789°E.

Vegetation association F6 (0.46 Ha): *Eucalyptus obliqua* +/- *E. baxteri* +/- *E. cosmophylla* open forest +/- *E. fasciculosa* over *Xanthorrhoea semiplana* with sparse shrubs and sedges and significant pasture weeds

Vegetation association F7 (0.70 Ha): *Eucalyptus obliqua* +/- *E. baxteri* +/- *E. cosmophylla* open forest +/- *E. fasciculosa* over *Xanthorrhoea semiplana* over shrubs and sedges

Vegetation association F8 (1.66 Ha): *Eucalyptus cosmophylla* + *E. obliqua* + *E. baxteri* open forest +/- *E. fasciculosa* +/- *Allocasuarina striata* over *Xanthorrhoea semiplana* with shrubs and sedges

Vegetation association F9 (0.49 Ha): *Eucalyptus obliqua* +/- *E. baxteri* +/- *E. cosmophylla* open forest +/- *E. fasciculosa* over *Xanthorrhoea semiplana* over shrubs and sedges

Block 5

Figure 24: Site map of Block 5 (in white) showing the single associated site and its three internal quadrat photopoints (white drop markers) which are labelled with the photpoint IDs (photographs are provided in Appendix 1). Waypoint data is as follows: H8.1 -35.71451°N, 137.22504°E; H8.2: -35.71569°N, 137.22384°E; H8.3: -35.71438°N, 137.22368°E.

Vegetation association H8 (16.90 Ha): *Eucalyptus cosmophylla* + *E. fasciculosa* + *E. leucoxylon* open forest +/- *E. obliqua* & *E. baxteri* over *Xanthorrhoea semiplana* over variable understorey of shrubs and sedges

Block 6

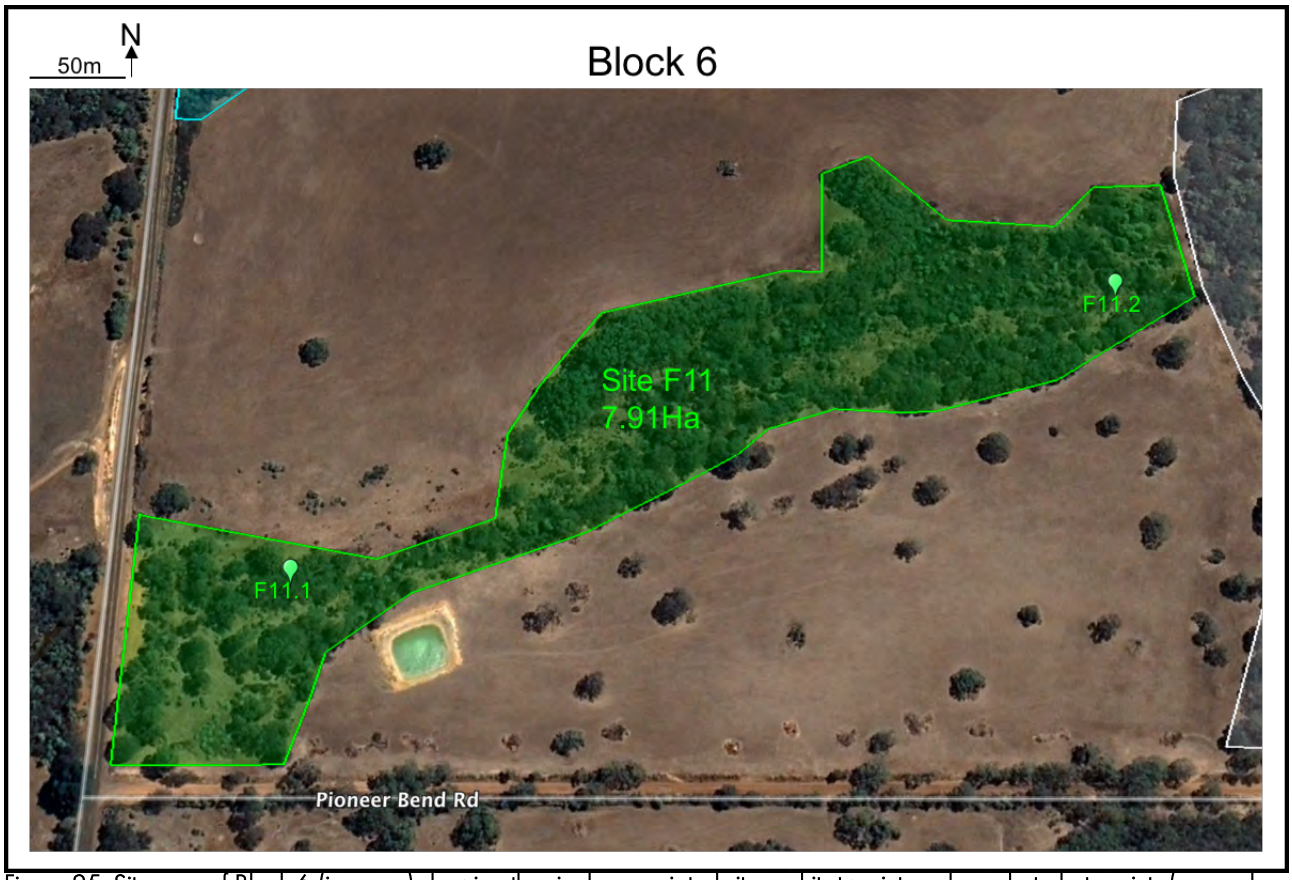


Figure 25: Site map of Block 6 (in green) showing the single associated site and its two internal quadrat photopoints (green drop markers) which are labelled with the photpoint IDs (photographs are provided in Appendix 1). Waypoint data is as follows: F11.1 -35.71546°N, 137.21629°E; F11.2: -35.71370°N, 137.22222°E.

Vegetation association F11 (7.91 Ha): Eucalyptus cosmophylla + E. fasciculosa + E. leucoxylon open forest +/- E. obliqua & E. baxteri over Xanthorrhoea semiplana over variable understorey of shrubs, sedges and pasture weeds

Block 7

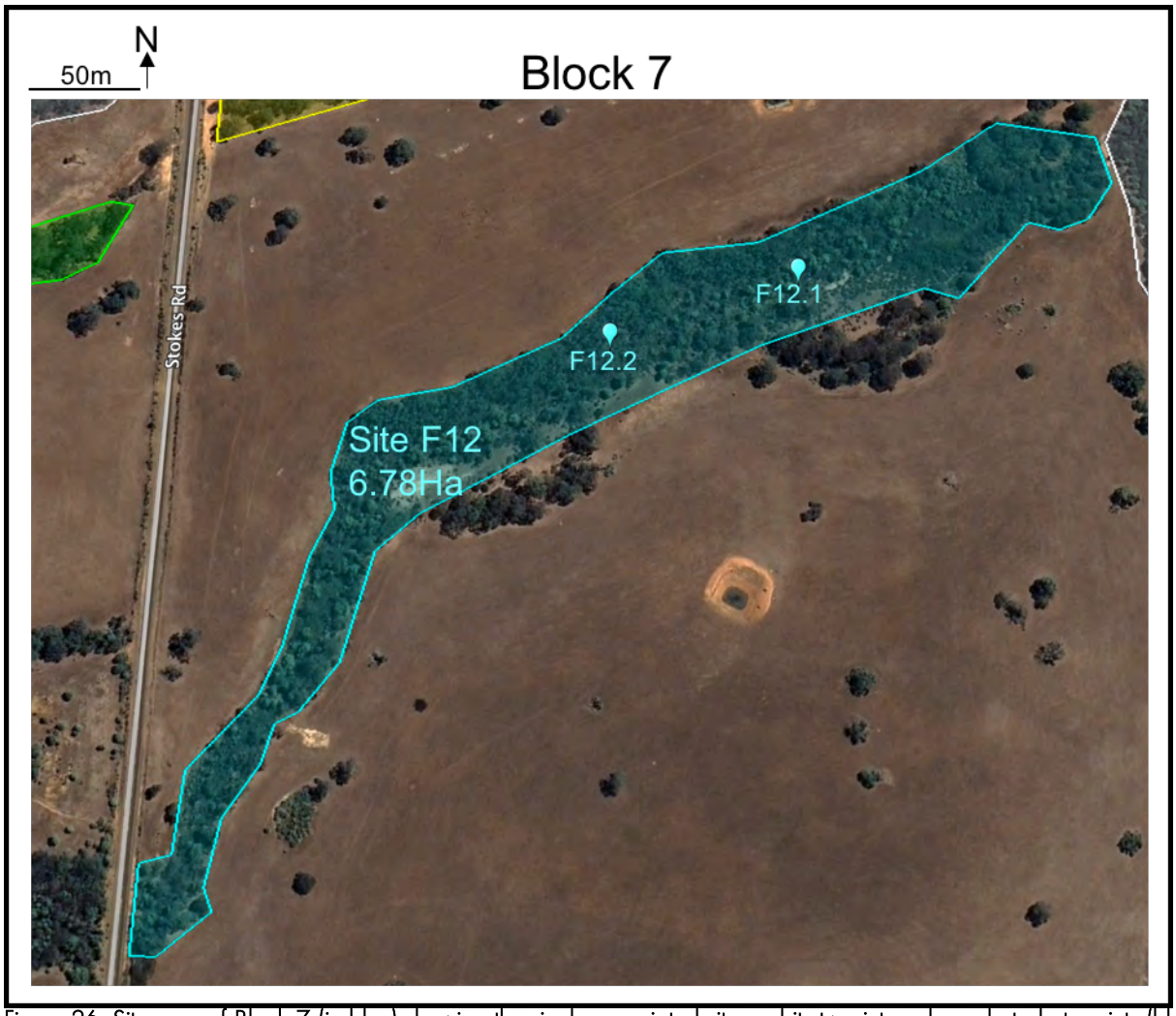


Figure 26: Site map of Block 7 (in blue) showing the single associated site and its two internal quadrat photopoints (blue drop markers) which are labelled with the photpoint IDs (photographs are provided in Appendix 1). Waypoint data is as follows: F12.1 -35.70803°N, 137.22028°E; F12.2: -35.70851°N, 137.21870°E.

Vegetation association F12 (6.78 Ha): *Eucalyptus cosmophylla* + *E. fasciculosa* + *E. leucoxylon* open forest +/- *E. obliqua* & *E. baxteri* over *Xanthorrhoea semiplana* over variable understorey of shrubs, sedges and pasture weeds

Blocks 8 and 9

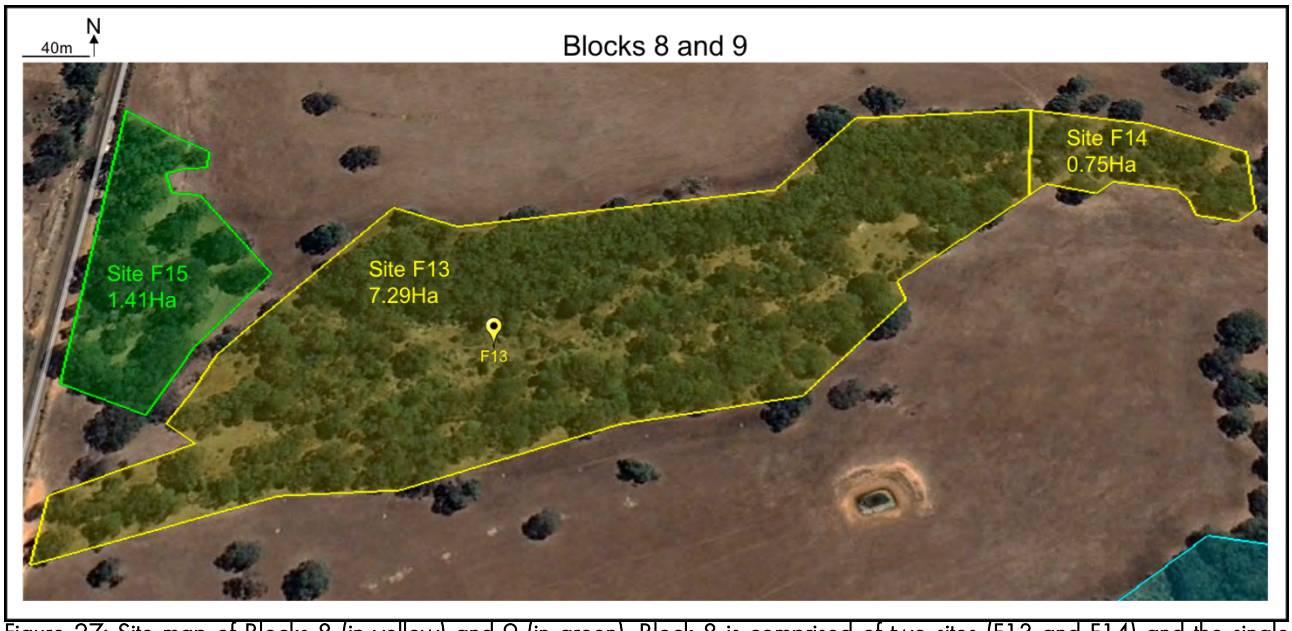


Figure 27: Site map of Blocks 8 (in yellow) and 9 (in green). Block 8 is comprised of two sites (F13 and F14) and the single associated internal quadrat photopoint (yellow drop marker) is with the photpoint ID (photographs are provided in Appendix 1). Block 9 has a single site (F15). Waypoint data is as follows: F13: -35.70571°N, 137.21784°E.

Vegetation association F13 (7.29 Ha): *Eucalyptus leucoxylon +/- E. cosmophylla +/- E. fasciculosa +/- E. cladocalyx +/- E. obliqua +/- E. baxteri* open forest over *Xanthorrhoea semiplana,* shrubs, sedges and pasture weeds

Vegetation association F14 (0.75 Ha): *Eucalyptus leucoxylon +/- E. cosmophylla* open forest over *Xanthorrhoea semiplana,* shrubs and sedges over pasture grass

Vegetation association F15 (1.41 Ha): *Eucalyptus leucoxylon +/- E. cosmophylla* open forest over sparse *Xanthorrhoea semiplana,* shrubs and sedges, over pasture weeds

Block 10

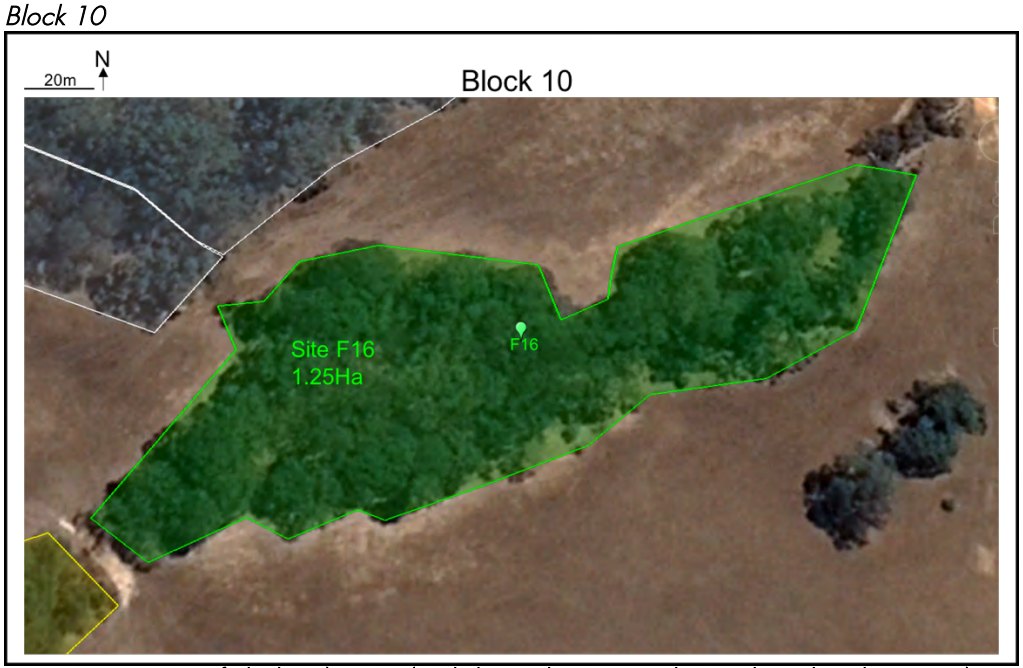


Figure 28: Site map of Block10 (in green) with the single associated internal quadrat photopoint (green drop marker) showing the photpoint ID (photographs are provided in Appendix 1). Waypoint data is as follows: F16: -35.70788°N, 137.21329°E.

Vegetation association F16 (1.25 Ha): *Eucalyptus leucoxylon +/- E. cosmophylla* open forest over sparse *Xanthorrhoea semiplana,* shrubs and sedges, over pasture weeds

Block 11

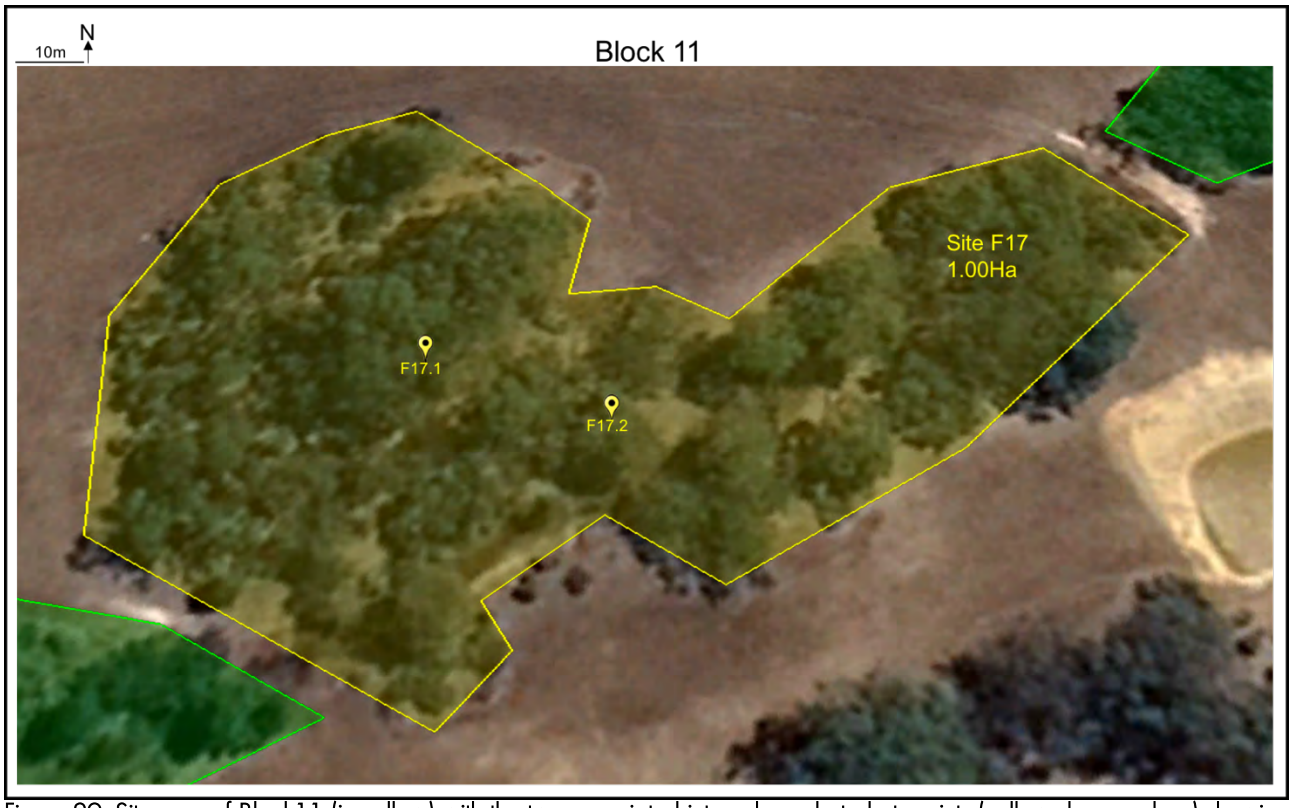


Figure 29: Site map of Block11 (in yellow) with the two associated internal quadrat photopoints (yellow drop markers) showing the photpoint IDs (photographs are provided in Appendix 1). Waypoint data is as follows: F17.1: -35.70877°N, 137.21075°E; F17.2: -35.70887°N, 137.21107°E.

Vegetation association F17 (1.00 Ha): *Eucalyptus cosmophylla* +/- *E. leucoxylon* +/- *E. obliqua* +/- *E. baxteri* open woodland over *Xanthorrhoea semiplana* shrubs, sedges and pasture weeds

Block 12

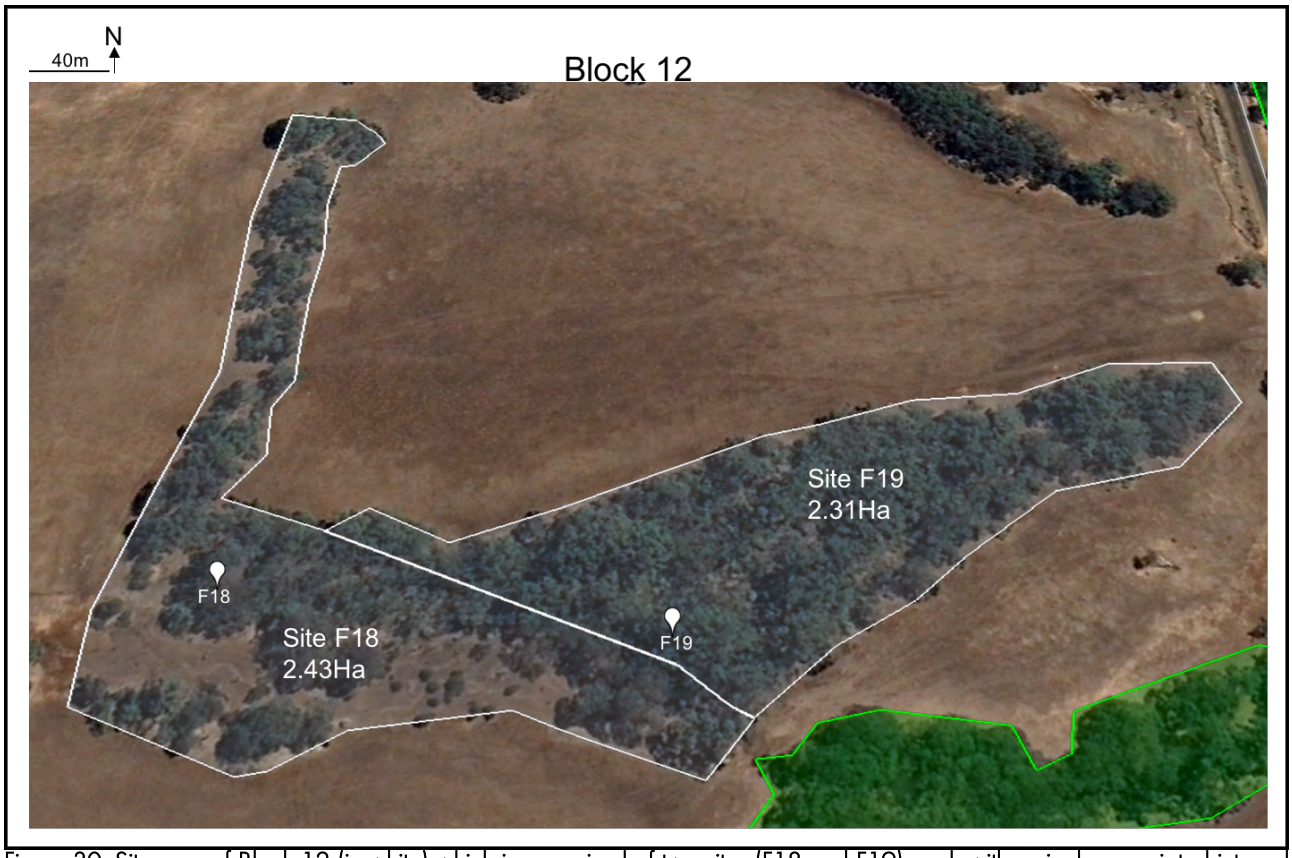


Figure 30: Site map of Block 12 (in white) which is comprised of two sites (F18 and F19) each with a single associated internal quadrat photopoint (white drop marker) labelled with the photpoint ID (photographs are provided in Appendix 1). Waypoint data is as follows: F18: -35.70717°N, 137.21006°E; F19: -35.70735°N, 137.21199°E.

Vegetation association F18 (2.43 Ha): *Eucalyptus cosmophylla* +/- *E. leucoxylon* +/- *E. obliqua* +/- *E. baxteri* open woodland over *Xanthorrhoea semiplana* shrubs, sedges and pasture weeds

Vegetation association F19 (2.31 Ha): *Eucalyptus cladocalyx* +/- *E. fasciculosa* +/- *E. cosmophylla* open forest over *Xanthorrhoea semiplana* over shrubs, sedges and pasture weeds

Block 13

Figure 31: Site map of Block 13 (in green) which is comprised of 19sites (F20-F29, F34, F47 and H9-15). The block is associated with a number of internal quadrat photopoints (green drop marker) labelled with the photpoint IDs (photographs are provided in Appendix 1). A number of supplementary (non-quadrat) photopoints were also establsihed and are indicated by numbered dots each with a white arrow showing the direction of the associated photograph(s). Waypoint data is for all photopoints in Block 13 is provided in Table 12. Supplementary photos are shown in the following figures: Figure 50 (photos 1 & 2 for SiteH9), Figure 51 (photos 6 & 7 for Site H10), Figure 52 (photo 8 for Site H10), Figure 53 (photos 4 & 5 for Site H12), Figure 54 (photos 12 & 13 for Site H13), Figure 55 (photo 11 for Site H15), Figure 56 (photo 3 for Site F23), Figure 58 (photos 9 & 10 for Sites F25, F26 & F28).

Vegetation association F20 (0.66 Ha): *Eucalyptus cosmophylla +/- E. fasciculosa +/- E. obliqua +/- E. baxteri* open woodland over *Xanthorrhoea semiplana* over shrubs, sedges and pasture weeds

Vegetation association F21 (7.00 Ha): *Eucalyptus obliqua +/- E. baxteri +/- E. cosmophylla* open woodland +/- *E. fasciculosa* over *Xanthorrhoea semiplana* over shrubs and sedges

Vegetation association F22 (2.58 Ha): *Eucalyptus cosmophylla +/- E. obliqua +/- E. baxteri +/- E. fasciculosa* open woodland over *Xanthorrhoea semiplana,* shrubs and sedges

Vegetation association F23 (5.50 Ha): *Eucalyptus cladocalyx +/- E. fasciculosa +/- E. cosmophylla* open forest over *Xanthorrhoea semiplana* over sparse shrubs and sedges

Vegetation association F24 (2.63 Ha): *Eucalyptus cosmophylla +/- E. obliqua +/- E. baxteri +/- E. fasciculosa* open woodland over *Xanthorrhoea semiplana,* shrubs, sedges and pasture weeds

Vegetation association F25 (2.72 Ha): *Eucalyptus obliqua +/- E. baxteri +/- E. cosmophylla* open woodland +/- *E. fasciculosa* over *Xanthorrhoea semiplana* over shrubs and sedges

Vegetation association F26 (1.64 Ha): *Eucalyptus obliqua +/- E. baxteri +/- E. cosmophylla* open woodland +/- *E. fasciculosa* over *Xanthorrhoea semiplana* over sparse shrubs, sedges and pasture weeds

Vegetation association F27 (0.68 Ha): *Eucalyptus obliqua +/- E. baxteri +/- E. cosmophylla* open woodland +/- *E. fasciculosa* over *Xanthorrhoea semiplana* over shrubs and sedges

Vegetation association F28 (0.71 Ha): *Eucalyptus obliqua +/- E. baxteri +/- E. cosmophylla* open woodland +/- *E. fasciculosa* over *Xanthorrhoea semiplana* over shrubs and sedges

Vegetation association F29 (0.59 Ha): *Eucalyptus cosmophylla +/- E. obliqua +/- E. baxteri +/- E. fasciculosa +/- E. leucoxylon* open woodland over *Xanthorrhoea semiplana,* shrubs, sedges and pasture weeds

Vegetation association F34 (0.70 Ha): *Eucalyptus cosmophylla +/- E. obliqua +/- E. baxteri +/- E. fasciculosa* open woodland over pasture weeds

Vegetation association F47 (0.84Ha): *Eucalyptus cosmophylla +/- E. obliqua +/- E. baxteri +/- E. fasciculosa +/- E. leucoxylon* open woodland over *Xanthorrhoea semiplana,* shrubs, sedges and pasture weeds

Vegetation association H9 (4.92 Ha): *Eucalyptus cosmophylla +/- E. obliqua +/- E. baxteri +/- E. fasciculosa +/- E. leucoxylon* open woodland over *Xanthorrhoea semiplana,* shrubs, sedges and pasture weeds

Vegetation association H10 (8.84 Ha): *Eucalyptus cladocalyx +/- E. fasciculosa +/- E. cosmophylla* open forest over *Xanthorrhoea semiplana* with variable understorey of shrubs and sedges

Vegetation association H11 (1.61 Ha): *Eucalyptus cosmophylla +/- E. fasciculosa +/- E. obliqua +/- E. baxteri* open woodland over *Xanthorrhoea semiplana,* shrubs, sedges and pasture weeds

Vegetation association H12 (4.20 Ha): *Eucalyptus cosmophylla +/- E. fasciculosa +/- E. obliqua +/- E. baxteri* open woodland over *Xanthorrhoea semiplana,* shrubs, sedges and pasture weeds

Vegetation association H13 (16.2 Ha): *Eucalyptus cladocalyx +/- E. fasciculosa +/- E. cosmophylla* open forest over *Xanthorrhoea semiplana* with variable understorey of shrubs, heath and sedges

Vegetation association H14 (3.17Ha): *Eucalyptus cosmophylla +/- E. fasciculosa +/- E. cladocalyx +/- E. obliqua +/- E. baxteri* open woodland over *Xanthorrhoea semiplana,* shrubs, sedges and pasture weeds

Vegetation association H15 (7.28 Ha): *Eucalyptus obliqua +/- E. baxteri +/- E. cosmophylla* open woodland over *Xanthorrhoea semiplana* over shrubs and sedges

Table 12. Waypoint data and desriptions of all photopoints associated with Block 13 which contains 19 sites. A map of the block with associated sites and phoopoints is shown in Figure 31. Quadrat photopoints are shown in Appendix 1. Supplementarty photos are shown in Figures 50-56 & 58 and the relevant figure is listed in the photo description.

Vegetation Qaudrat Photopoints			
Photopoint ID	Description	Latitude	Longitude
F20	Internal vegetation quadrat photopoint for site F20	-35.71121°N	137.20234°E
F21	Internal vegetation quadrat photopoint for site F21	-35.71157°N	137.19807°E
F23.1	Internal vegetation quadrat photopoint #1 for site F23	-35.70970°N	137.19419°E
F23.2	Internal vegetation quadrat photopoint #2 for site F23	-35.70857°N	137.19515°E
F24	Internal vegetation quadrat photopoint for site F24	-35.70797°N	137.19767°E
F25.1	Internal vegetation quadrat photopoint #1 for site F25	-35.70619°N	137.19508°E
F25.2	Internal vegetation quadrat photopoint #2 for site F25	-35.70570°N	137.19807°E
F26.1	Internal vegetation quadrat photopoint #1 for site F26	-35.70632°N	137.19188°E
F26.2	Internal vegetation quadrat photopoint #2 for site F26	-35.70546°N	137.19050°E
F27	Internal vegetation quadrat photopoint for site F27	-35.70739°N	137.19059°E
F28	Internal vegetation quadrat photopoint for site F28	-35.70393°N	137.19042°E
F34.1	Internal vegetation quadrat photopoint #1 for site F34	-35.69970°N	137.19702°E
F34.2	Internal vegetation quadrat photopoint #2 for site F34	-35.69824°N	137.19693°E
F47	Internal vegetation quadrat photopoint for site F37	-35.70967°N	137.20251°E
H9.1	Internal vegetation quadrat photopoint #1 for site H9	-35.71086°N	137.20708°E
H9.2	Internal vegetation quadrat photopoint #2 for site H9	-35.71091°N	137.20546°E
H10.1	Internal vegetation quadrat photopoint #1 for site H10	-35.70416°N	137.20316°E
H10.2	Internal vegetation quadrat photopoint #2 for site H10	-35.70622°N	137.20088°E
H11	Internal vegetation quadrat photopoint for site H11	-35.70784°N	137.20184°E
H12.1	Internal vegetation quadrat photopoint #1 for site H12	-35.70469°N	137.20303°E
H12.2	Internal vegetation quadrat photopoint #2 for site H12	-35.70732°N	137.20701°E
H13.1	Internal vegetation quadrat photopoint #1 for site H13	-35.70219°N	137.20350°E
H13.2	Internal vegetation quadrat photopoint #2 for site H13	-35.70230°N	137.20102°E
H13.3	Internal vegetation quadrat photopoint #3 for site H13	-35.70302°N	137.20080°E
H13.4	Internal vegetation quadrat photopoint #4 for site H13	-35.70177°N	137.19963°E
H14	Internal vegetation quadrat photopoint for site H14	-35.70271°N	137.19552°E
H15	Internal vegetation quadrat photopoint for site H14	-35.70180°N	137.19090°E
Supplementary Photopoints (non-quadrat)			
Photopoint ID	Description	Latitude	Longitude
1	External photopoint looking along fenceline on southern margin of site H9 (Figure 50)	-35.71080°N	137.20757°E
2	External photopoint looking along fenceline on southern margin of site H9 (Figure 50)	-35.71114°N	137.20611°E
3	External photopoint looking along eastern margin of site F23 (Figure 56)	-35.71042°N	137.19451°E
4	External photopoint looking at two views of the norhern margin of site H12 (Figure 53)	-35.70682°N	137.20742°E
5	External photopoint looking at northern margin of site H12 (Figure 53)	-35.70639°N	137.20545°E
6	External photopoint looking along fenceline on southern margin of site H10 (Figure 51)	-35.70752°N	137.20396°E
7	External photopoint looking at northern margin of site H10 (Figure 51)	-35.70444°N	137.20270°E
8	Internal photopoint showing *Pinus radiata* weed in site H10 (Figure 52)	-35.70680°N	137.20104°E
9	F25-F26 boundary (external photopoint) (Figure 58)	-35.70656°N	137.19370°E
10	F26-F27 boundary (external photopoint) (Figure 58)	-35.70508°N	137.19075°E
11	External photopoint looking at northern margin of site H15 (Figure 55)	-35.70146°N	137.19399°E
12	External photopoint looking at northern margin of site H13 (Figure 54)	-35.70076°N	137.19945°E
13	External photopoint looking across fence into typical vegetation of site H13 (Figure 54)	-35.70071°N	137.20117°E

Block 17

Figure 32: Site map of Block 17 (in blue) showing the two associated sites and their quadrat photopoints (blue drop marker) labelled with the photpoint IDs (photographs are provided in Appendix 1). Waypoint data is as follows: F30: -35.69599°N, 137.19727°E; F31: -35.69472°N, 137.19680°E.

Vegetation association F30 (1.69 Ha): *Eucalyptus cladocalyx* +/- *E. cosmophylla* +/- *E. fasciculosa* open forest over *Xanthorrhoea semiplana*, sparse shrubs and pasture weeds

Vegetation association F31 (0.33 Ha): *Eucalyptus leucoxylon* +/- *E. cosmophylla* +/- *E. fasciculosa* open woodland over *Xanthorrhoea semiplana,* sparse shrubs and pasture weeds

Block 18

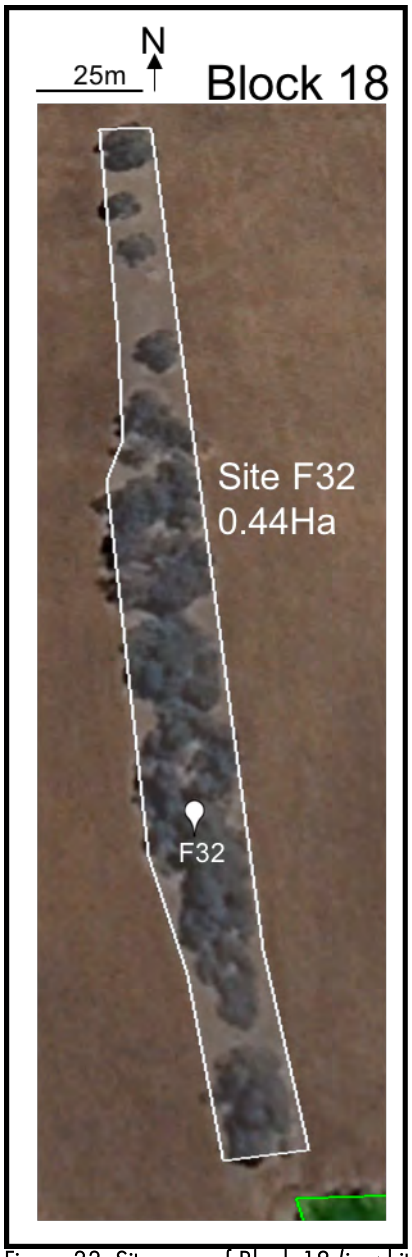


Figure 33: Site map of Block 18 (in white) comprising a single site with its quadrat photopoint (white drop marker) labelled with the photpoint ID (photographs are provided in Appendix 1). Waypoint data is as follows: F32: -35.69294°N, 137.19676°E.

Vegetation association F32 (0.44 Ha): *Eucalyptus cosmophylla* low open woodland over pasture weeds

Block 19

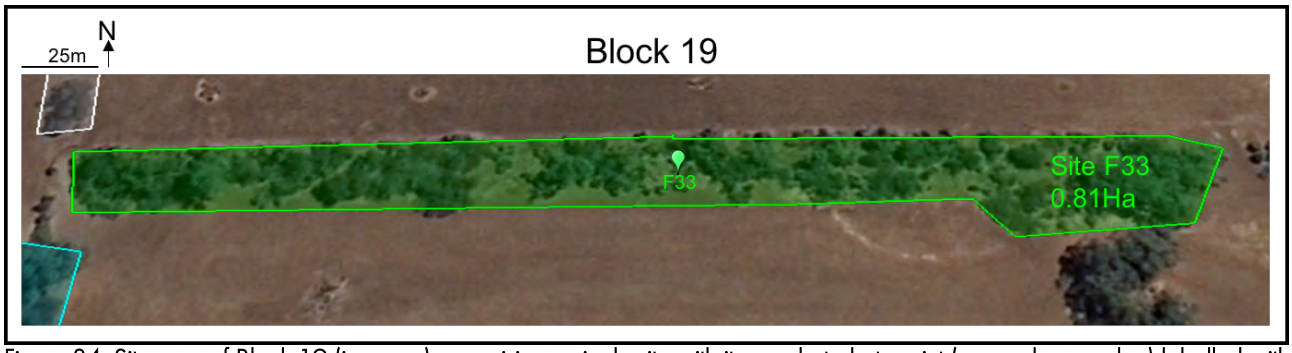


Figure 34: Site map of Block 19 (in green) comprising a single site with its quadrat photopoint (green drop marker) labelled with the photpoint ID (photographs are provided in Appendix 1). Waypoint data is as follows: F33: -35.69363°N, 137.19883°E.

Vegetation association F33 (0.81 Ha): *Eucalyptus cosmophylla* +/- *E. obliqua* +/- *E. baxteri* +/- *E. fasciculosa* open woodland over *Xanthorrhoea semiplana,* sparse large shrubs and pasture weeds

Block 20

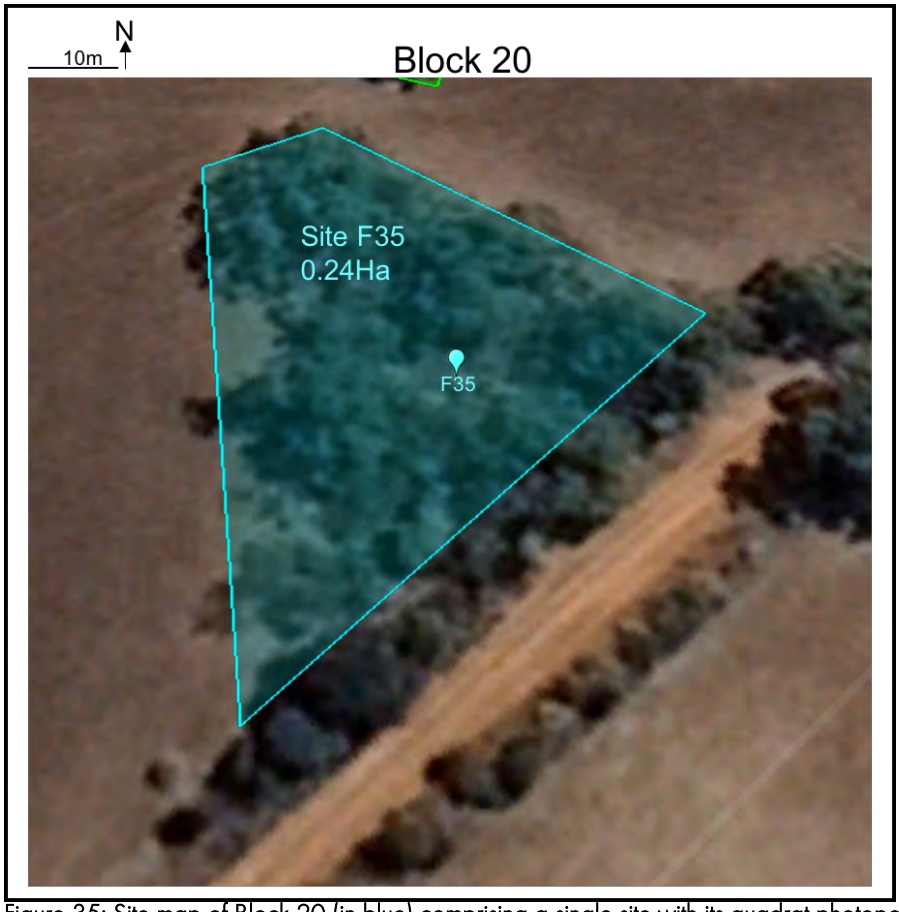


Figure 35: Site map of Block 20 (in blue) comprising a single site with its quadrat photopoint (blue drop marker) labelled with the photpoint ID (photographs are provided in Appendix 1). Waypoint data is as follows: F35: -35.69541°N, 137.21140°E.

Vegetation association F35 (0.24 Ha): *Eucalyptus cosmophylla* + *E. obliqua* + *E. baxteri* open forest +/- *E. fasciculosa* over *Xanthorrhoea semiplana* over sparse shrubs, sedges and pasture weeds

Block 21

Figure 36: Site map of Block 21 (in green) comprising a single site with its quadrat photopoint (blue drop marker) labelled with the photpoint ID (photographs are provided in Appendix 1). There is also one external photopoint indicated with a dot and an arrow indicating the directon of the photograph which is shown in Figure 61. Waypoint data is as follows: F36: -35.69210°N, 137.21142°E; external photopoint -35.69237°N, 137.21124°E.

Vegetation association F36 (1.55 Ha): *Eucalyptus cosmophylla* + *E. obliqua* + *E. baxteri* open forest +/- *E. fasciculosa* over *Xanthorrhoea semiplana* over sparse shrubs, sedges and pasture weeds

Block 22

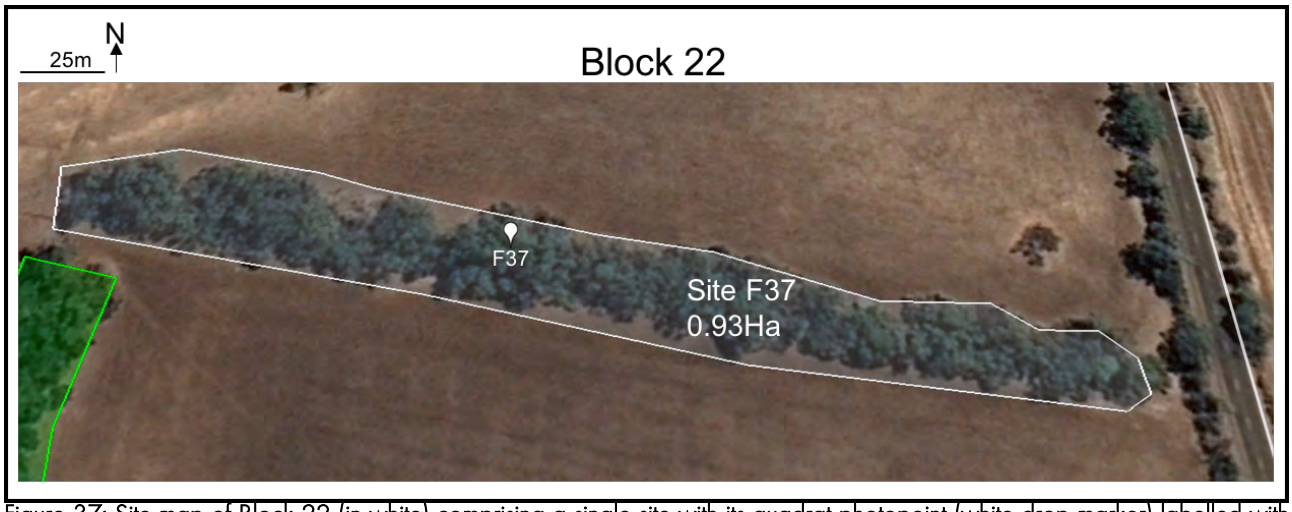


Figure 37: Site map of Block 22 (in white) comprising a single site with its quadrat photopoint (white drop marker) labelled with the photpoint ID (photographs are provided in Appendix 1). Waypoint data is as follows: F37: -35.69019°N, 137.21288°E.

Vegetation association F37 (0.93 Ha): *Eucalyptus cosmophylla* + *E. obliqua* + *E. baxteri* open forest +/- *E. fasciculosa* over *Xanthorrhoea semiplana* over sparse shrubs, sedges and pasture weeds

Block 23

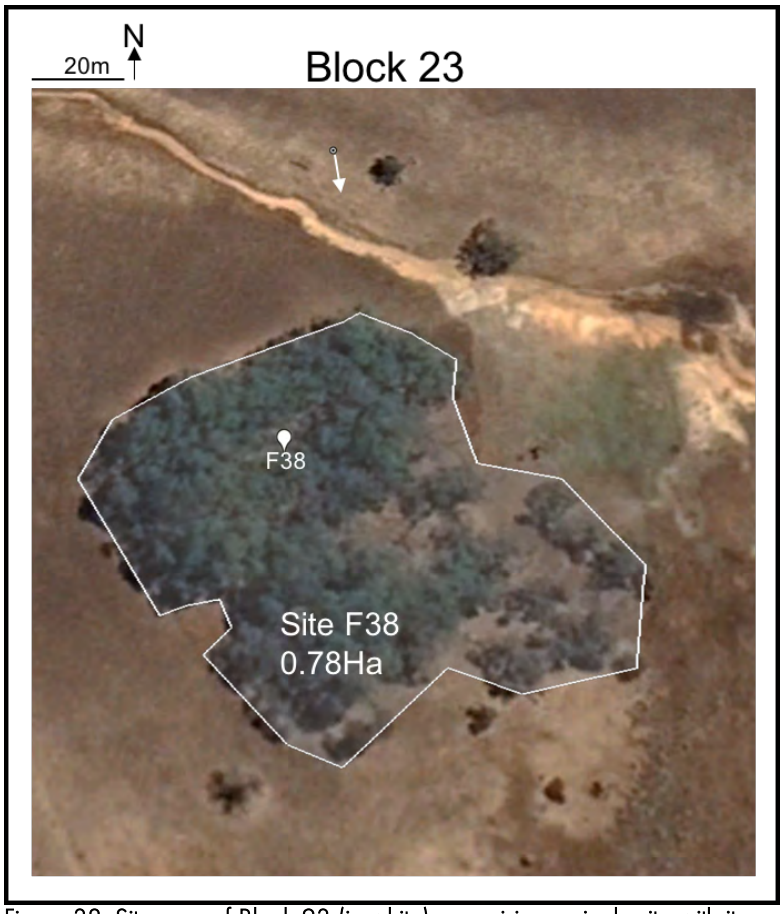


Figure 38: Site map of Block 23 (in white) comprising a single site with its quadrat photopoint (white drop marker) labelled with the photpoint ID (photographs are provided in Appendix 1). There is also one external photopoint indicated with a dot and an arrow indicating the directon of the photograph, which is shown in Figure 62. Waypoint data is as follows: F38: -35.69119°N, 137.20467°E; external photopoint: -35.69038°N, 137.20481°E.

Vegetation association F38 (0.78 Ha): *Eucalyptus fasciculosa* +/- *E. cosmophylla* open forest over pasture grass and sparse *Juncus pallidus*

Block 24

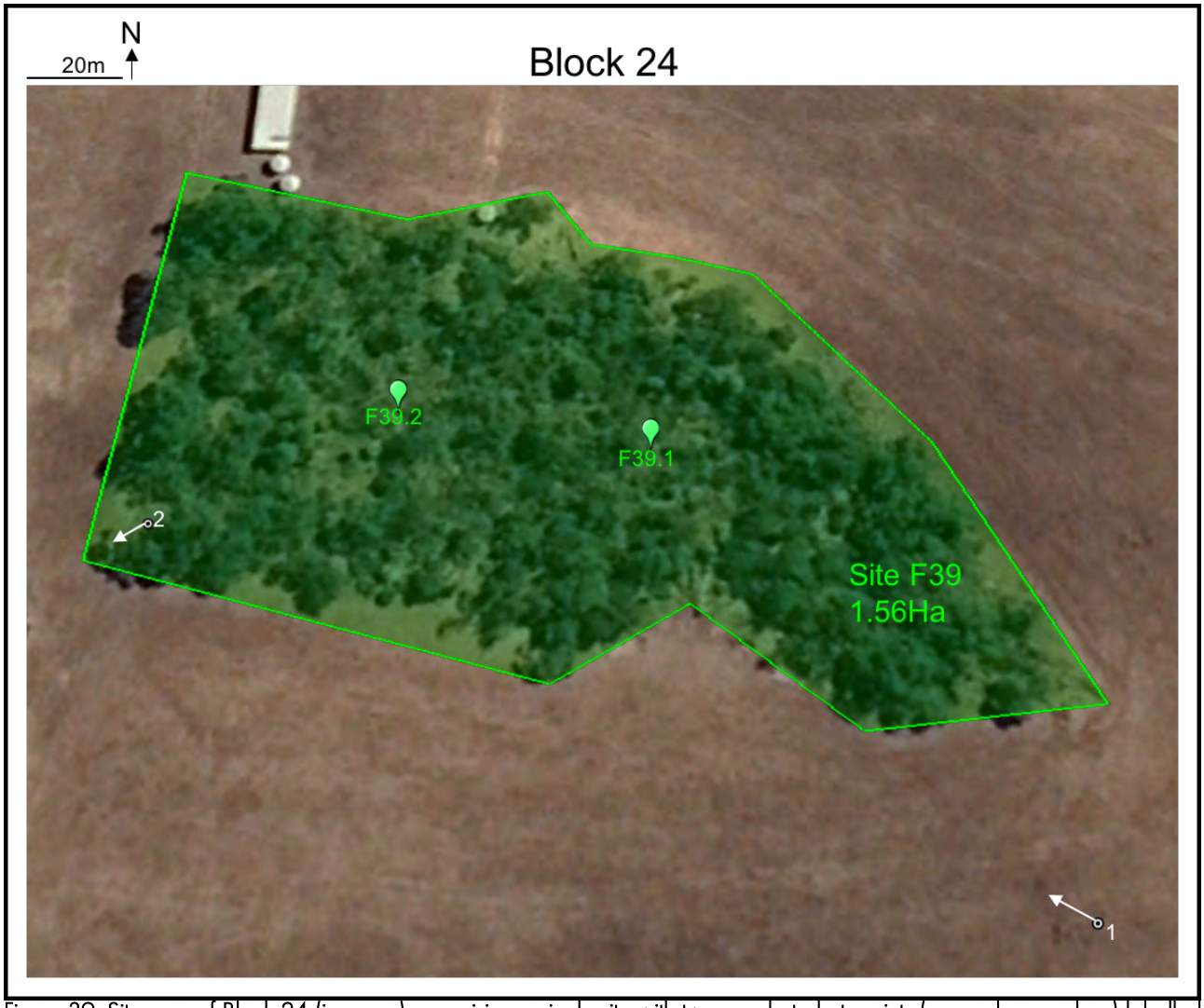


Figure 39: Site map of Block 24 (in green) comprising a single site with two quadrat photopoints (green drop markers) labelled with the photpoint IDs (photographs are provided in Appendix 1). There are also two peripheral photopoints indicated with a dot and an arrow indicating the directon of the photograph (they are also numbered and shown in Figure 63). Waypoint data is as follows: F39.1: -35.68618°N, 137.20841°E; F39.2: -35.68610°N, 137.20785°E; peripheral photopoint 1; -35.68702°N, 137.20923°E; peripheral photopoint 2; -35.68633°N, 137.20732°E.

Vegetation association F39 (1.56 Ha): *Eucalyptus cosmophylla* + *E. obliqua* + *E. baxteri* open forest over *Xanthorrhoea semiplana* over sparse shrubs, sedges and pasture weeds

Block 25

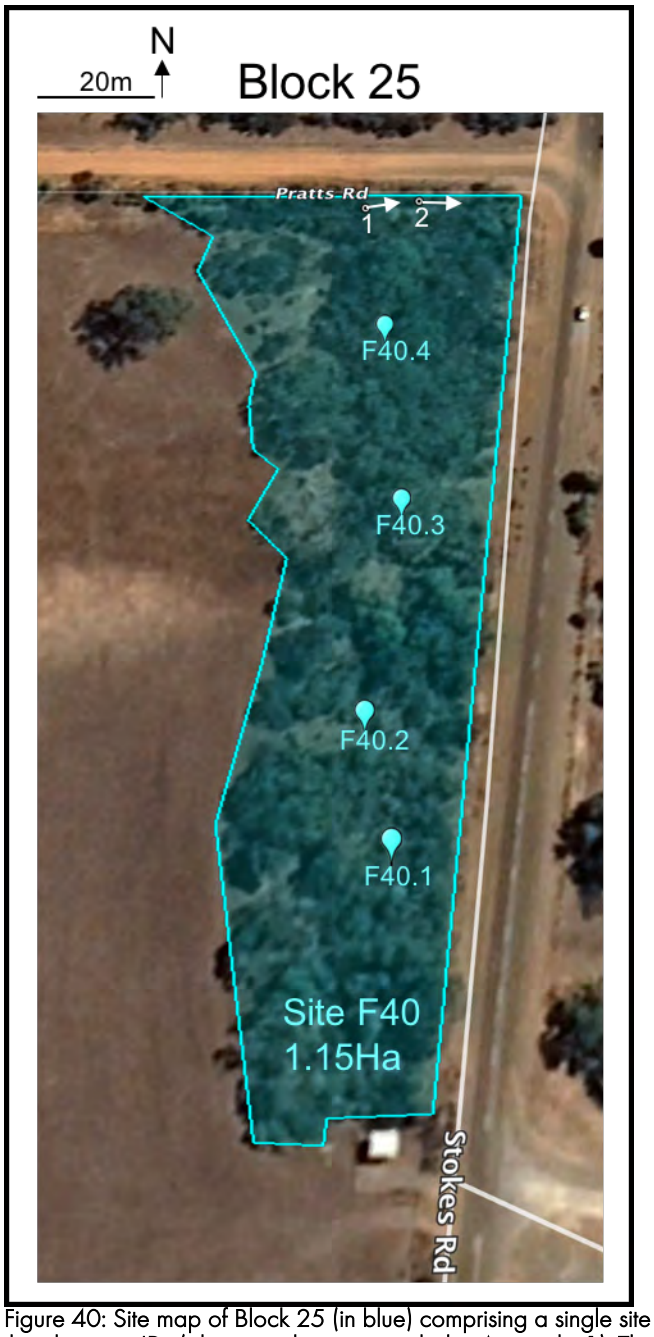


Figure 40: Site map of Block 25 (in blue) comprising a single site with four quadrat photopoints (blue drop markers) labelled with the photpoint IDs (photographs are provided in Appendix 1). There are also two peripheral photopoints indicated with a dot and an arrow indicating the directon of the photograph (they are also numbered and shown in Figure 64). Waypoint data is as follows: F40.1: -35.67822°N, 137.21474°E; F40.2: -35.67797°N, 137.21464°E; F40.3: -35.67751°N, 137.21465°E; F40.4: -35.67708°N, 137.214540°E; peripheral photopoint 1; -35.67671°N, 137.21443°E; peripheral photopoint 2; -35.67669°N, 137.21457°E.

Vegetation association F40 (1.15 Ha): *Eucalyptus obliqua* +/- *E. baxteri* +/- *E. cosmophylla* open forest +/- *E. fasciculosa* over *Xanthorrhoea semiplana* over shrubs, sedges and pasture weeds

Block 26

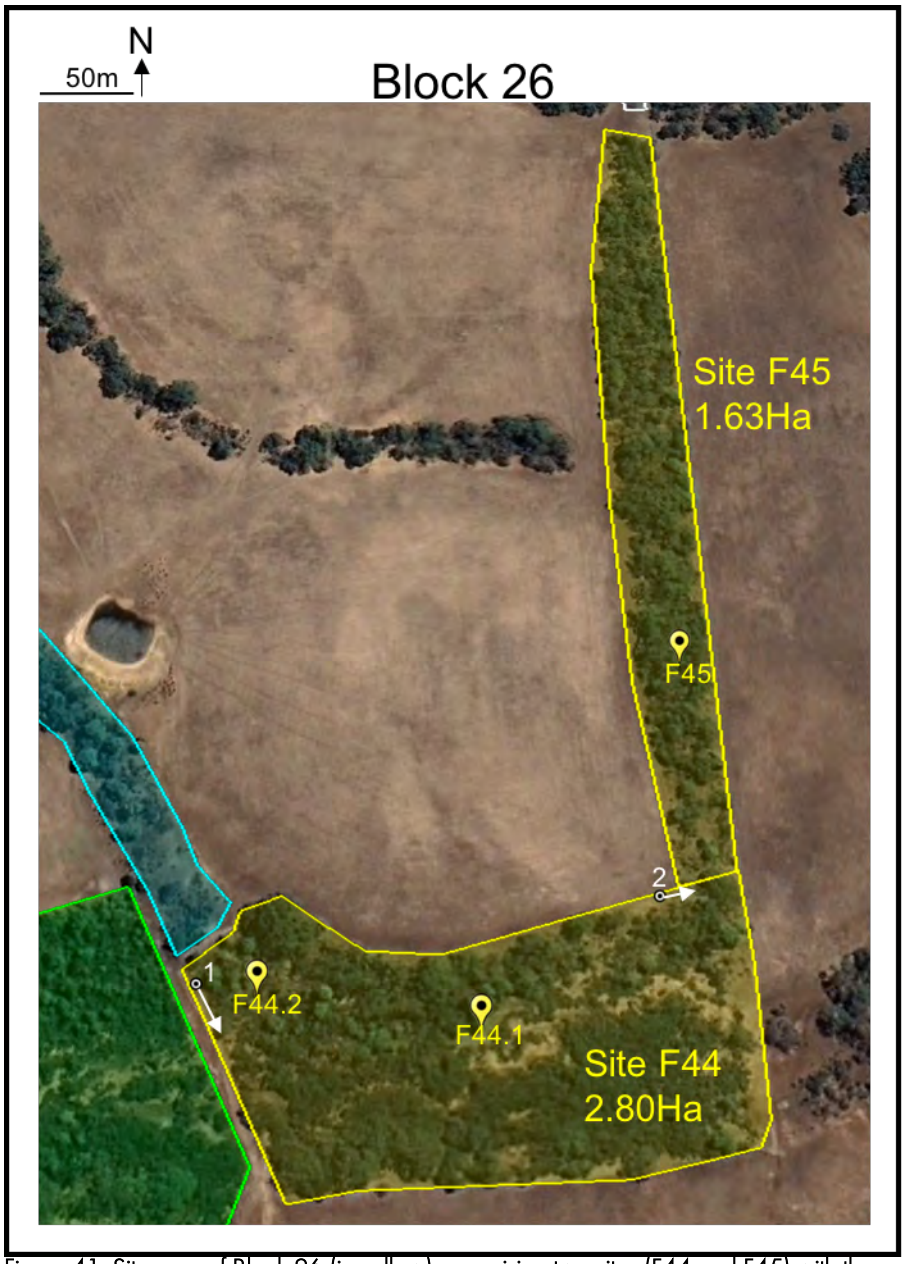


Figure 41: Site map of Block 26 (in yellow) comprising two sites (F44 and F45) with three associated quadrat photopoints (yelow drop markers) labelled with the photpoint IDs (photographs are provided in Appendix 1). There are also two peripheral photopoints associated with site F44 that are shown with a dot and an arrow indicating the directon of the photograph (they are also numbered and shown in Figure 65). Waypoint data is as follows: F44.1: -35.68959°N, 137.19538°E; F44.2: -35.68945°N, 137.19427°E; F45: -35.68798°N, 137.19652°E; peripheral photopoint 1; -35.68940°N, 137.19397°E; peripheral photopoint 2; -35.68903°N, 137.19632°E.

Vegetation association F44 (2.80 Ha): *Eucalyptus leucoxylon* + *E. fasciculosa* + *E. cosmophylla* + open woodland over *Xanthorrhoea semiplana* and wetland shrubs, sedges and pasture weeds

Vegetation association F45 (1.63 Ha): *Eucalyptus obliqua* +/- *E. baxteri* +/- *E. cosmophylla* open forest over *Xanthorrhoea semiplana,* sparse shrubs, sedges and pasture weeds

Block 28

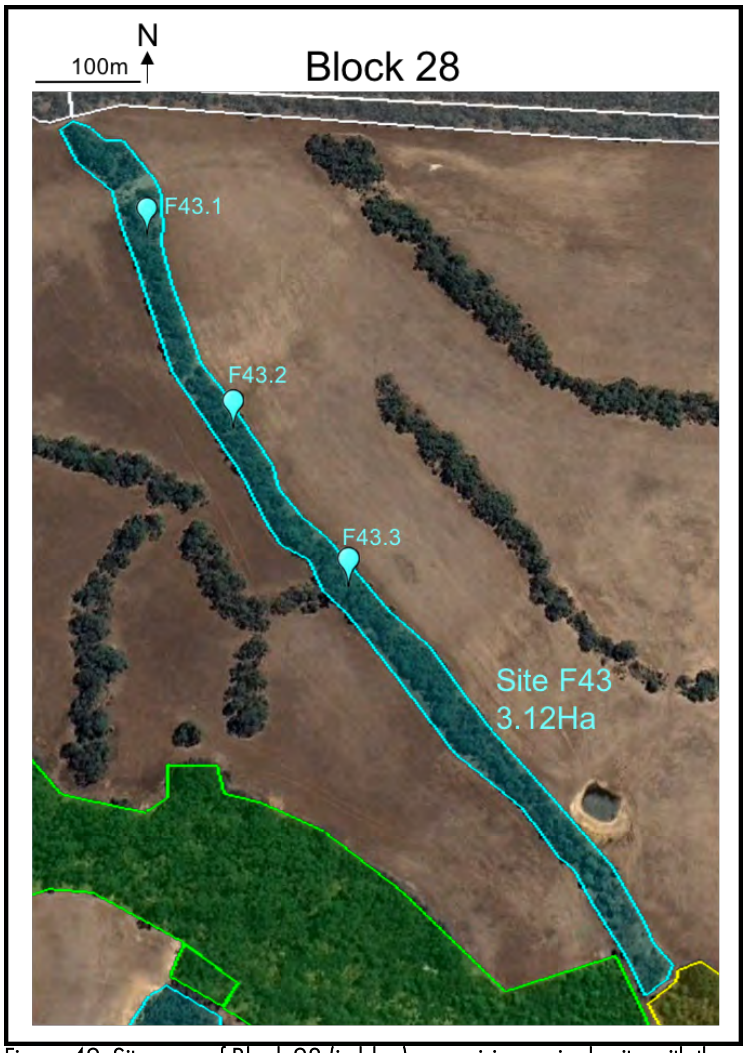


Figure 42: Site map of Block 28 (in blue) comprising a single site with three quadrat photopoints (blue drop markers) labelled with the photpoint IDs (photographs are provided in Appendix 1). Waypoint data is as follows: F43.1: -35.68292°N, 137.18892°E; F43.2: -35.68470°N, 137.18990°E; F43.3: -35.68607°N, 137.19109°E.

Vegetation association F43 (3.12 Ha): *Eucalyptus obliqua +/- E. baxteri +/- E. cosmophylla +/- E. fasciculosa* open forest over *Xanthorrhoea semiplana,* sparse shrubs, sedges and pasture weeds

Block 29

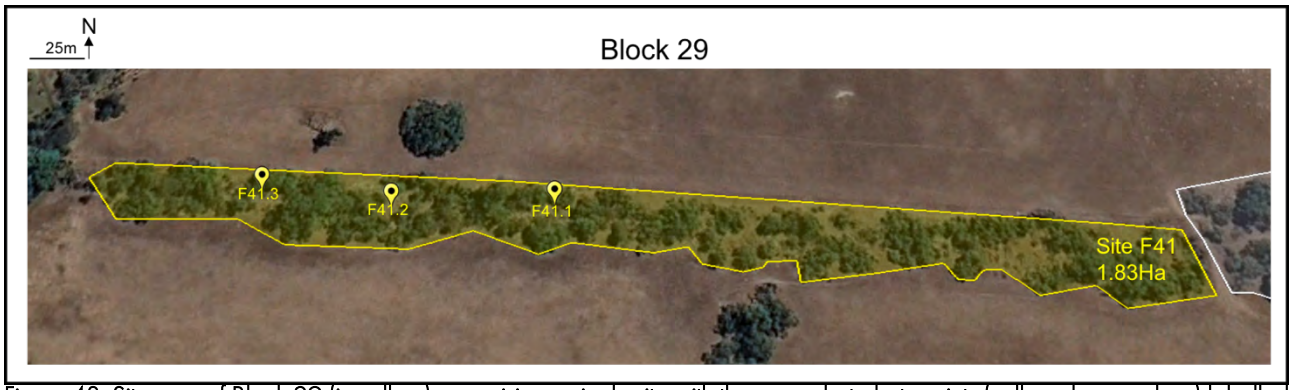


Figure 43: Site map of Block 29 (in yellow) comprising a single site with three quadrat photopoints (yellow drop markers) labelled with the photpoint IDs (photographs are provided in Appendix 1). Waypoint data is as follows: F41.1: -35.68135°N, 137.18361°E; F41.2: -35.68136°N, 137.18271°E; F41.3: -35.68128°N, 137.18198°E.

Vegetation association F41 (1.83 Ha): *Eucalyptus obliqua +/- E. baxteri +/- E. cosmophylla* open forest over *Xanthorrhoea semiplana,* sparse shrubs, sedges and pasture weeds

Block 30

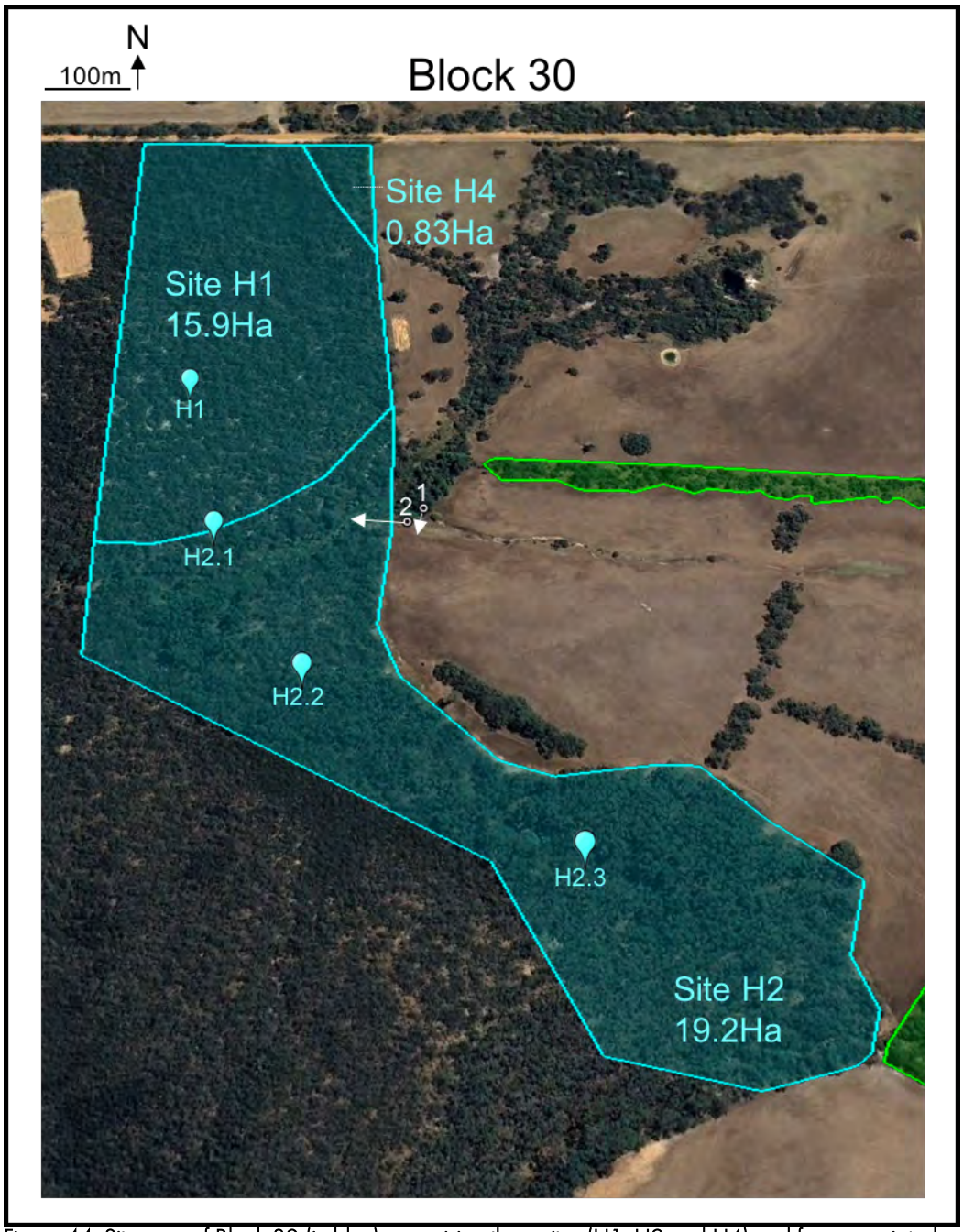


Figure 44: Site map of Block 30 (in blue) comprising three sites (H1, H2 and H4) and four associated quadrat photopoints (blue drop markers) labelled with the photpoint IDs (photographs are provided in Appendix 1). There are also two external photopoints associated with site H2 that are shown with a dot and an arrow indicating the directon of the photograph (they are also numbered and shown in Figure 67). Waypoint data is as follows: H1: -35.68041°N, 137.17736°E; H2.1: -35.68218°N, 137.17775°E; H2.2: -35.68378°N, 137.17883°E; H2.3: -35.68559°N, 137.18189°E; external photopoint 1; -35.68179°N, 137.18026°E; external photopoint 2; -35.68195°N, 137.18006°E.

Vegetation association H1 (15.9 Ha): *Eucalyptus obliqua* + *E. baxteri* +/- *E. cosmophylla* open woodland over *Xanthorrhoea semiplana* over shrubs and sedges

Vegetation association H2 (19.2 Ha): *Eucalyptus cladocalyx* +/- *E. fasciculosa* open forest +/- *Melaleuca lanceolata* over X*anthorrhoea semiplana* +/- *Gahnia trifida* with variable understorey of shrubs, heath and sedges

Vegetation association H4 (0.83 Ha): *Eucalyptus cladocalyx* +/- *E. fasciculosa* open forest +/- *Melaleuca lanceolata* over X*anthorrhoea semiplana* +/- *Gahnia trifida* with variable understorey of shrubs, heath and sedges

Block 31

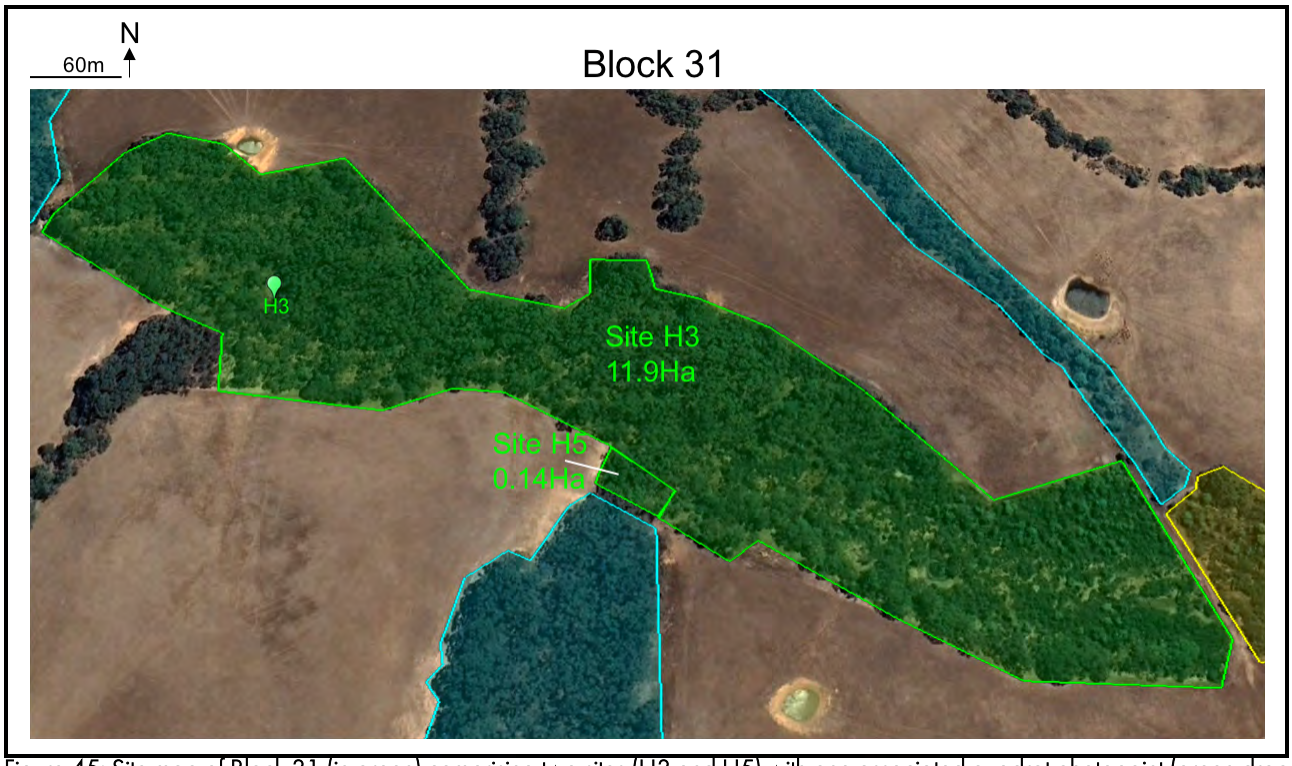


Figure 45: Site map of Block 31 (in green) comprising two sites (H3 and H5) with one associated quadrat photopoint (green drop marker) labelled with the photpoint ID (photographs are provided in Appendix 1). Waypoint data is as follows: H3: -35.68785°N, 137.18682°E.

Vegetation association H3 (11.9 Ha): *Eucalyptus cladocalyx +/- E. fasciculosa +/- E. leucoxylon* open forest +/- *Melaleuca lanceolata* over X*anthorrhoea semiplana +/- Gahnia trifida* with variable understorey of shrubs, sedges and pasture weeds

Vegetation association H5 (0.14 Ha): *Eucalyptus cladocalyx +/- E. leucoxylon* closed forest over X*anthorrhoea semiplana*, shrubs and pasture weeds

Block 32

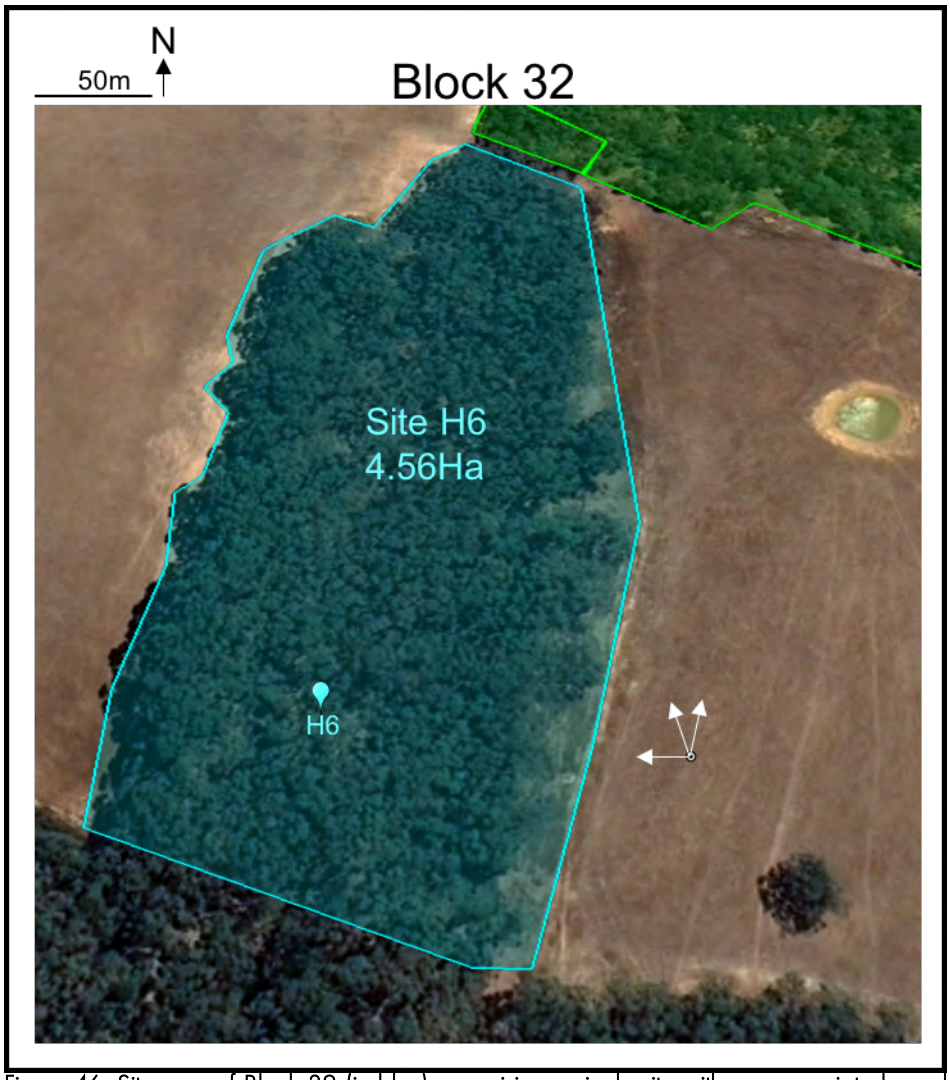


Figure 46: Site map of Block 32 (in blue) comprising a single site with one associated quadrat photopoint (blue drop marker) labelled with the photpoint ID (photographs are provided in Appendix 1). There is also an external photopoint from which three photographs were taken (shown as a dot with arrows indicating the directon of the photographs which are shown in Figure 70). Waypoint data is as follows: H6: -35.69160°N, 137.18886°E; external photopoint: -35.69175°N, 137.19017°E.

Vegetation association H6 (4.56 Ha): *Eucalyptus cladocalyx* +/- *E. leucoxylon* closed forest over X*anthorrhoea semiplana*, shrubs and pasture weeds

Summary of sites proposed for SEB through Heritage Agreements

Table 13: Summary of all sites proposed as SEB offsets through Heitage Agreement (new or adding to existing agreements). Sites are listed in numeric order. The area of the site, the associated Block, threatened species scores, biodiversity scores, USB scores and SEB points provided, are all shown for each site. A total of 492.73 SEB points is provided by these sites. Excel spreadsheets from which the various scores and SEB points are derived, are provided in full in Appendix 2.

Block	Site	Area (Ha)	Threatened Ecological Community / Ecosystem score	Threatened Flora score	Threatened Fauna score	Unit Biodiversity Score	Total Biodiversity Score	Future UBS negative score	Future UBS positive score	UBS gain score	SEB points provided
30	H1	15.9	1.0	0.08	0.1	87.48	1390.90	86.03	90.14	4.11	65.29
30	H2	19.2	1.0	0.08	0.1	100.89	1937.03	100.12	101.57	1.45	27.75
31	H3	11.9	1.0	0.08	0.1	85.11	1012.86	83.70	88.70	4.00	47.55
30	H4	0.83	1.0	0.08	0.1	100.89	83.74	100.12	101.57	1.45	1.20
31	H5	0.14	1.0	0.04	0.1	72.63	10.17	70.93	76.19	5.27	0.74
32	H6	4.56	1.0	0.04	0.1	71.28	325.04	69.61	74.78	5.17	23.58
27	H7	28.5	1.0	0.04	0.1	86.82	2474.35	85.71	88.57	2.85	81.29
5	H8	16.9	1.0	0.08	0.1	92.89	1569.81	91.90	94.25	2.34	39.62
13	H9	4.92	1.0	0.08	0.1	68.34	336.23	66.42	72.62	6.20	30.48
13	H10	8.84	1.0	0.08	0.1	86.36	763.39	85.00	88.78	3.78	33.43
13	H11	1.61	1.0	0.08	0.1	77.28	124.42	75.58	80.76	5.18	8.34
13	H12	4.20	1.0	0.08	0.1	77.28	324.56	75.58	80.76	5.18	21.76
13	H13	16.2	1.0	0.08	0.1	88.22	1429.17	86.95	90.40	3.45	55.87
13	H14	3.17	1.0	0.08	0.1	73.62	233.38	71.82	77.46	5.64	17.88
13	H15	7.28	1.0	0.08	0.1	77.04	560.83	75.33	80.55	5.21	37.95
										TOTAL POINTS	492.73

Summary of sites proposed for SEB through fencing/stock exclusion

Table 14: Summary of all sites proposed as SEB offsets through fencing and stock exclusion. Sites are listed in numeric order. The area of the site, the associated Block, threatened species scores, biodiversity scores, USB scores and SEB points provided, are all shown for each site. A total of 527.74 SEB points is provided by these sites. Excel spreadsheets from which the various scores and SEB points are derived, are provided in Appendix 2.

Block	Site	Area (Ha)	Threatened Ecological Community / Ecosystem score	Threatened Flora score	Threatened Fauna score	Unit Biodiversity Score	Total Biodiversity Score	Future UBS negative score	Future UBS positive score	UBS gain score	SEB points provided
1	F1	0.98	1.0	0.08	0.1	64.85	63.55	62.92	69.20	6.28	6.15
1	F2	1.43	1.0	0.08	0.1	74.73	106.86	73.03	78.26	5.23	7.48
1	F3	0.50	1.0	0.08	0.1	53.47	26.74	51.46	58.39	6.93	3.46
1	F4	0.39	1.0	0.08	0.1	49.91	19.46	47.91	54.91	7.01	2.73
2	F5	0.90	1.0	0.08	0.1	49.44	44.49	47.45	54.39	6.94	6.25
3	F6	0.46	1.0	0.08	0.1	49.44	22.74	47.45	54.39	6.94	3.19
3	F7	0.70	1.0	0.08	0.1	52.97	37.08	50.98	57.84	6.86	4.80
3	F8	1.66	1.0	0.08	0.1	74.02	122.88	72.34	77.52	5.18	8.60
3	F9	0.49	1.0	0.08	0.1	52.97	25.95	50.98	57.84	6.86	3.36
4	F10	3.66	1.0	0.08	0.1	60.91	222.94	58.96	65.43	6.47	23.68
6	F11	7.91	1.0	0.08	0.1	84.49	668.34	83.06	87.16	4.10	32.43
7	F12	6.78	1.0	0.08	0.1	84.49	572.86	83.06	87.16	4.10	27.80
8	F13	7.29	1.0	0.08	0.1	76.77	559.69	75.06	80.31	5.25	38.26
8	F14	0.75	1.0	0.04	0.04	40.42	30.31	38.61	45.14	6.53	4.90
9	F15	1.41	1.0	0.04	0.04	35.47	50.02	33.78	40.03	6.25	8.81
10	F16	1.25	1.0	0.04	0.04	40.62	50.77	38.82	45.30	6.48	8.10
11	F17	1.00	1.0	0.04	0.1	61.64	61.64	59.74	65.99	6.25	6.25
12	F18	2.43	1.0	0.04	0.1	61.64	149.78	59.74	65.99	6.25	15.19
12	F19	2.31	1.0	0.04	0.1	81.31	187.82	79.95	83.80	3.85	8.90
13	F20	0.66	1.0	0.08	0.1	59.78	39.45	57.75	64.58	6.83	4.51
13	F21	7.00	1.0	0.08	0.1	58.03	406.18	55.98	62.90	6.92	48.43
13	F22	2.58	1.0	0.08	0.1	66.85	172.47	64.90	71.23	6.33	16.33
13	F23	5.50	1.0	0.08	0.1	72.99	401.45	71.17	76.89	5.71	31.42
13	F24	2.63	1.0	0.08	0.1	67.46	177.43	66.53	71.80	6.28	16.51
13	F25	2.72	1.0	0.08	0.1	65.23	177.43	63.26	69.73	6.46	17.58
13	F26	1.64	1.0	0.08	0.1	47.22	77.44	45.21	52.37	7.16	11.74
13	F27	0.68	1.0	0.08	0.1	62.75	42.67	60.75	67.39	6.65	4.52
13	F28	0.71	1.0	0.08	0.1	62.75	44.55	60.75	67.39	6.65	4.72
13	F29	0.59	1.0	0.08	0.1	46.00	27.14	44.00	51.16	7.16	4.22

Block	Site	Area (Ha)	Threatened Ecological Community / Ecosystem score	Threatened Flora score	Threatened Fauna score	Unit Biodiversity Score	Total Biodiversity Score	Future UBS negative score	Future UBS positive score	UBS gain score	SEB points provided
17	F30	1.69	1.0	0.08	0.1	43.21	73.03	41.29	48.23	6.94	11.73
17	F31	0.33	1.0	0.08	0.1	33.69	11.12	31.96	38.55	6.59	2.18
18	F32	0.44	1.0	0	0	9.45	4.16	8.82	12.28	3.47	1.53
19	F33	0.81	1.0	0.08	0.1	26.89	21.78	25.39	31.47	6.09	4.93
13	F34	0.70	1.0	0.04	0.1	22.22	15.56	20.91	26.50	5.59	3.92
20	F35	0.24	1.0	0.04	0.1	42.64	10.23	40.77	47.49	6.72	1.61
21	F36	1.55	1.0	0.08	0.1	46.49	72.06	44.53	51.50	6.96	10.79
22	F37	0.93	1.0	0.08	0.1	46.49	43.24	44.53	51.50	6.96	6.48
23	F38	0.78	1.0	0.04	0.1	27.36	21.34	25.85	31.85	6.00	4.68
24	F39	1.56	1.0	0.04	0.1	42.07	65.64	40.21	46.92	6.71	10.47
25	F40	1.15	1.0	0.08	0.1	60.00	69.00	58.04	64.57	6.53	7.51
29	F41	1.83	1.0	0.04	0.1	43.78	80.12	41.90	48.62	6.72	12.31
27	F42	0.83	1.0	0.04	0.1	50.99	42.32	49.03	55.82	6.79	5.63
28	F43	3.12	1.0	0.08	0.1	51.79	161.59	49.80	56.69	6.89	21.51
26	F44	2.80	1.0	0.08	0.1	68.24	191.08	66.32	72.53	6.20	17.37
26	F45	1.63	1.0	0.08	0.1	48.43	78.94	46.41	53.57	7.16	11.67
27	F46	1.00	1.0	0.08	0.1	47.98	47.98	45.98	53.07	7.09	7.09
13	F47	0.84	1.0	0.08	0.1	46.00	38.64	44.00	51.16	7.16	6.01
										TOTAL POINTS	527.74

Supplementary Site Photopoints and Other Photographs

These photographs were presented for several reasons, which are generally explained in captions:

- to provide external views of some sites
- to demonstrate the effect of management activities such as fencing
- to prove the presence of a species
- to provide some idea of variation at a site
- to provide additional photopoints for later comparison

They photographs set out in ascending of Block. Most of the photo locations are shown on maps in previous figures which are referred to in the captions. For those not shown on maps, GPS data is provided (it is also on the photos). Locations of all photographs are contained in Google Earth Pro location data files.

Block 1

F3-F4 Boundary

See Figure 13 for associated map and GPS data. Shown in Appendix 1 (page 4) as site photo for sites F3 andF4.

Block 3

F6-F9 Boundary

See Figure 23 for associated map and GPS data. Shown in Appendix 1 (page 8) as site photo for site F9.

Site F8

Figure 47: External photopoint for Site F show8 (left) with the adjacent existing Heritage Agreement (right) shown veiwed in the opposite direction. Site F8 was medium-high quality vegetation. Location of photograhs and waypoint data are given in Figure 23.

Block 4

Site F10

Figure 48: External photopoints for Site F10 showing vegetation of varying quality. *Eucalyptus obliqua* and *E. baxteri* (stringybarks) are dominant in this vegetation association (see top panels). Typical grazing of *Xanthorrhoea semiplana* is shown at bottom right. Location/identification of photographs and waypoint data are given in Figure 14.

Figure 49: Grazed understorey of moderate quality vegetation at Site F10, showing damage to small *Xanthorrhoea semiplana tateana* (State: Rare) and *Lepidosperma carphoides*, that could be avoided through stock exclusion. Waypoint data: -35.70946°N, 137.22760°E.

Block 13

Site H9

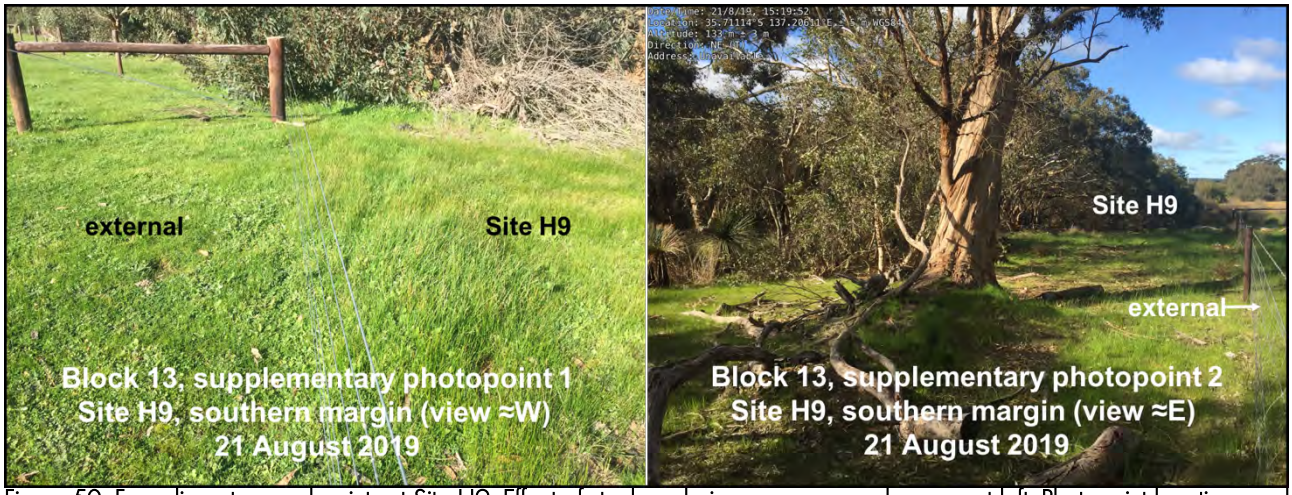


Figure 50. Fenceline at several points at Site H9. Effect of stock exclusion on grass can be seen at left. Photopoint locations and waypoint data are shown in Figure 32 and Table 12, respectively.

Site H10

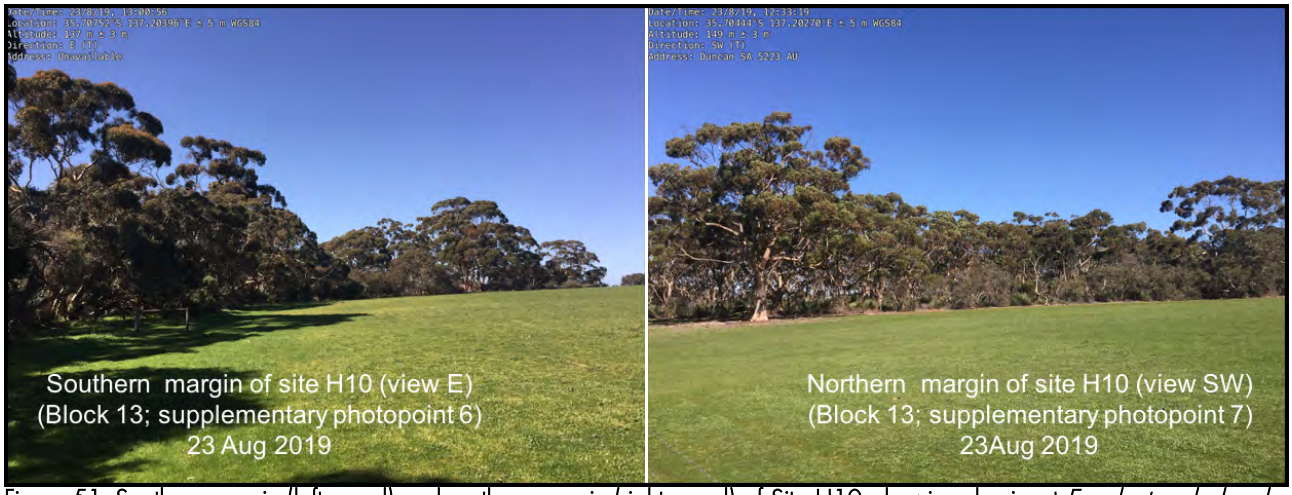


Figure 51. Southern margin (left panel) and northern margin (right panel) of Site H10, showing dominant *Eucalyptus cladocalyx* (Sugar gum). Photopoint locations and waypoint data are shown in Figure 32 and Table 12, respectively.

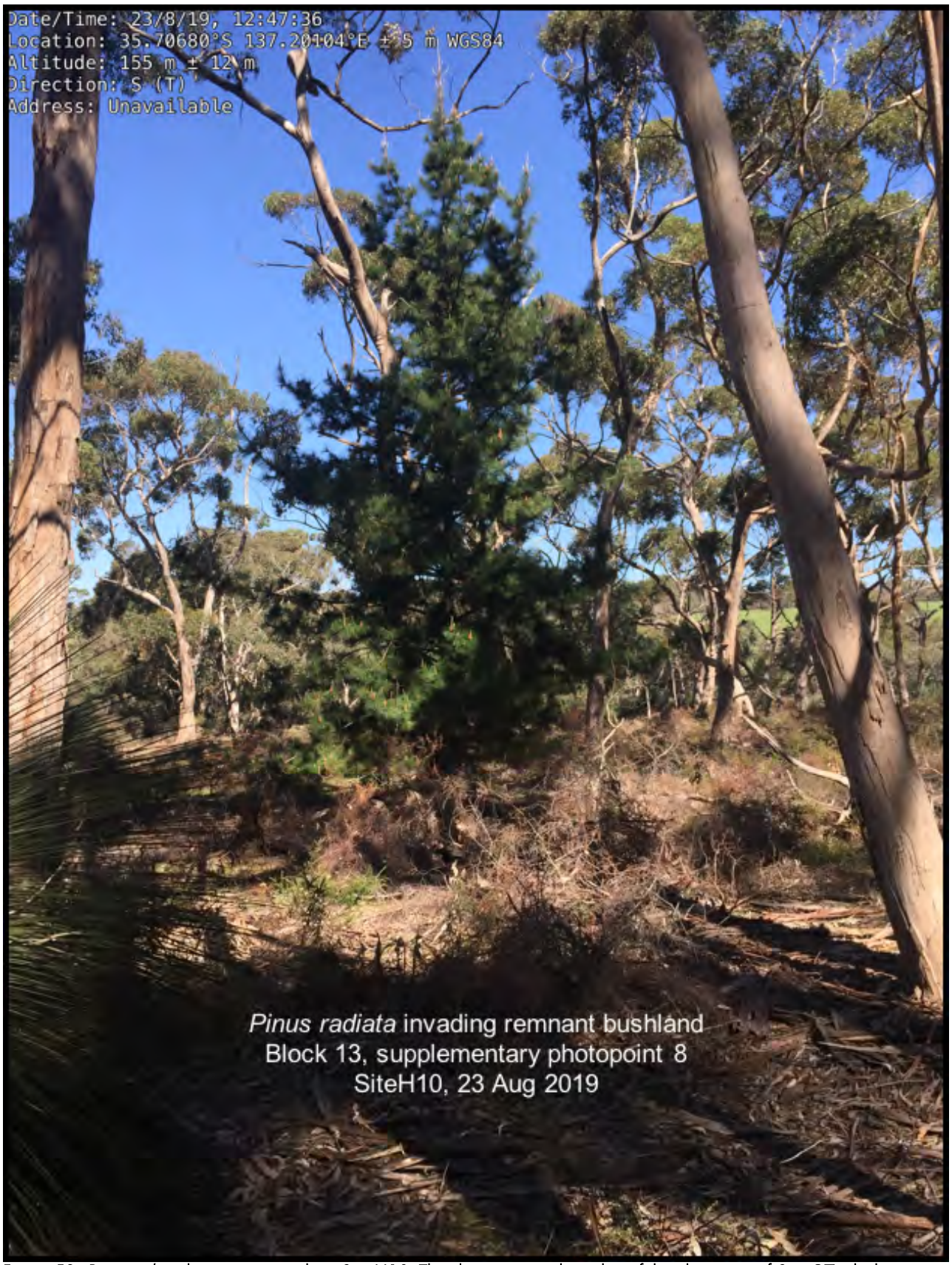


Figure 52. *Pinus radiata* becoming weedy in Site H10. This demonstrates the value of the clearance of Site C7 which is a pine forrest (≈1.5Ha) and is located less than 100m west of the tree shown here. Photopoint location and waypoint data are shown in Figure 32 and Table 12, respectively.

Site H12

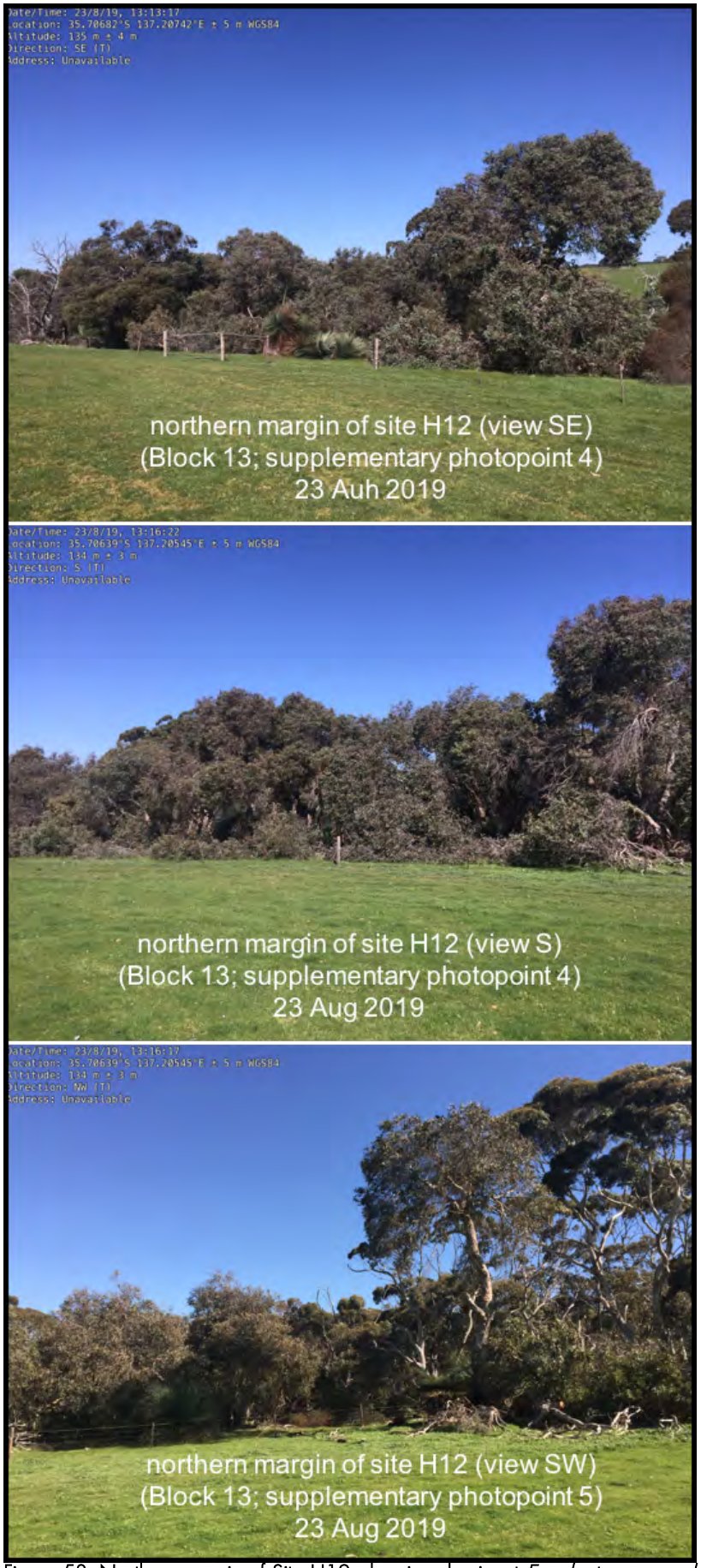


Figure 53. Northern margin of Site H12, showing dominant *Eucalyptus cosmophylla* (Cup gum) – a few isolated *E. cladocalyx* (Sugar gum) are visible on the right side of the bottom panel. Photopoint location and waypoint data are shown in Figure 32 and Table 12, respectively.

Site H13

Figure 54. Northern margin of Site H13, showing the large *Eucalyptus cladocalyx* (Sugar gum) that are dominant in this vegetation association. Photopoint locations and waypoint data are shown in Figure 32 and Table 12, respectively.

Site H15

Figure 55. Northern margin of Site H15, showing the *Eucalyptus obliqua* and *E. baxteri* (stringybarks) that are dominant in this vegetation association. Photopoint location and waypoint data are shown in Figure 32 and Table 12, respectively.

Site F23

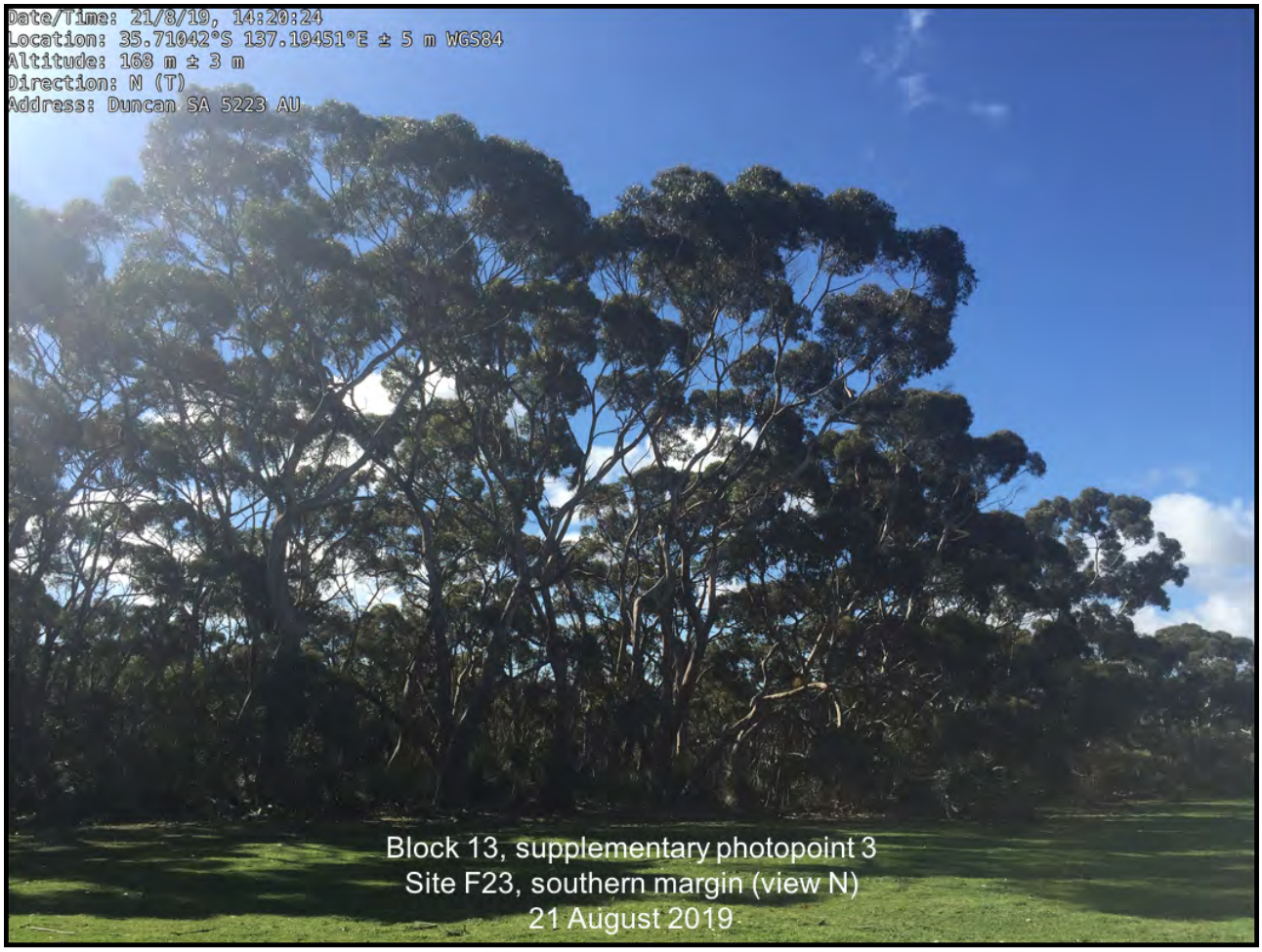


Figure 56. Southern margin of Site F23, showing large *Eucalyptus cladocalyx* (Suagr gum). Photopoint location and waypoint data are shown in Figure 32 and Table 12, respectively.

Site F24

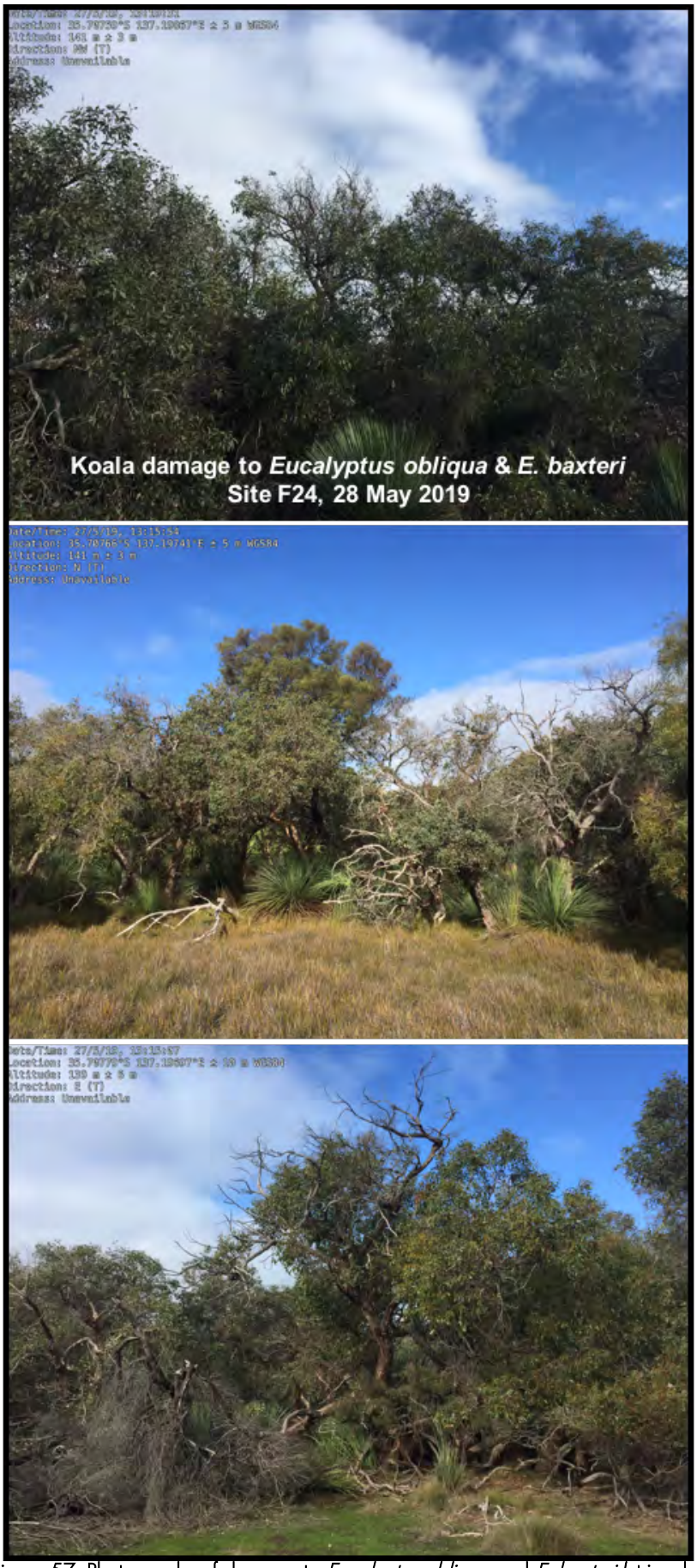


Figure 57: Photographs of damage to *Eucalyptus obliqua* and *E. baxteri* (stringybarks) at Site F24, caused by koalas which are introduced to Kangaroo Island. Waypoint data – top panel: -35.70759°N, 137.19867°E; centre panel: -35.70766°N, 137.19741°E; bottom panel: -35.70779°N, 137.19697°E.

Sites F25, F26 & F28

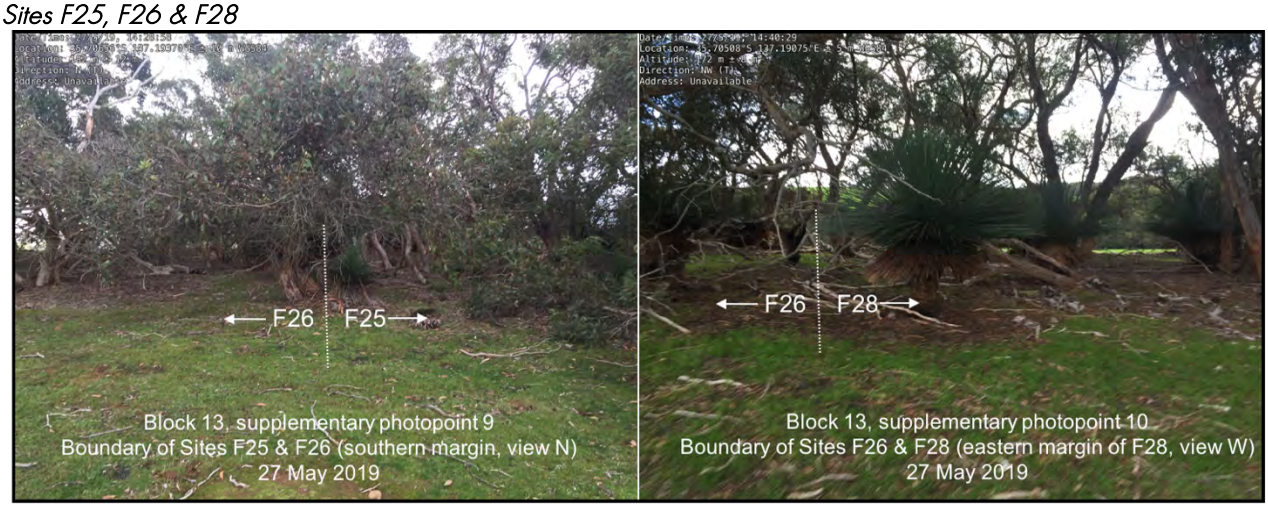


Figure 58. Dividing points between Site F25 and F26 (left panel) and Sites F26 and F28 (right panel). All sites are the same broad vegetation association, however, F26 is lower quality due to signifcanrly more pasture weeds in the understorey, less litter and less plant diversity. Photopoint locations and waypoint data are shown in Figure 32 and Table 12, respectively.

Block 15

Site C7

Figure 59. Northern margin of Site C7 which is a forest of *Pinus radiata*, proposed for removal. There are about six peripheral *Eucalyptus cosmophylla* (Cup gum) and a low number of *Xanthorrhoea semiplana tateana* (State: Rare) associated with the site. This site is acting as a seed-source for pines that are becoming weedy in adjacent bushland (see Figure 51) and its removal would be a recommended management option. Photopoint location and waypoint data is shown in Figure 17.

Block 16

Site C8

Figure 60. Southern margin of Site C8, which is poor quality vegetation. Photopoint location and waypoint data is given in Figure 18.

Block 21

Site F36

Figure 61. Western boundary of Site F36 showing how dense vegetation and large fallen wood prevents localised stock acces in paddock tree lines. Photopoint location and waypoint data are given in Figure 36.

Block 23

Site F38

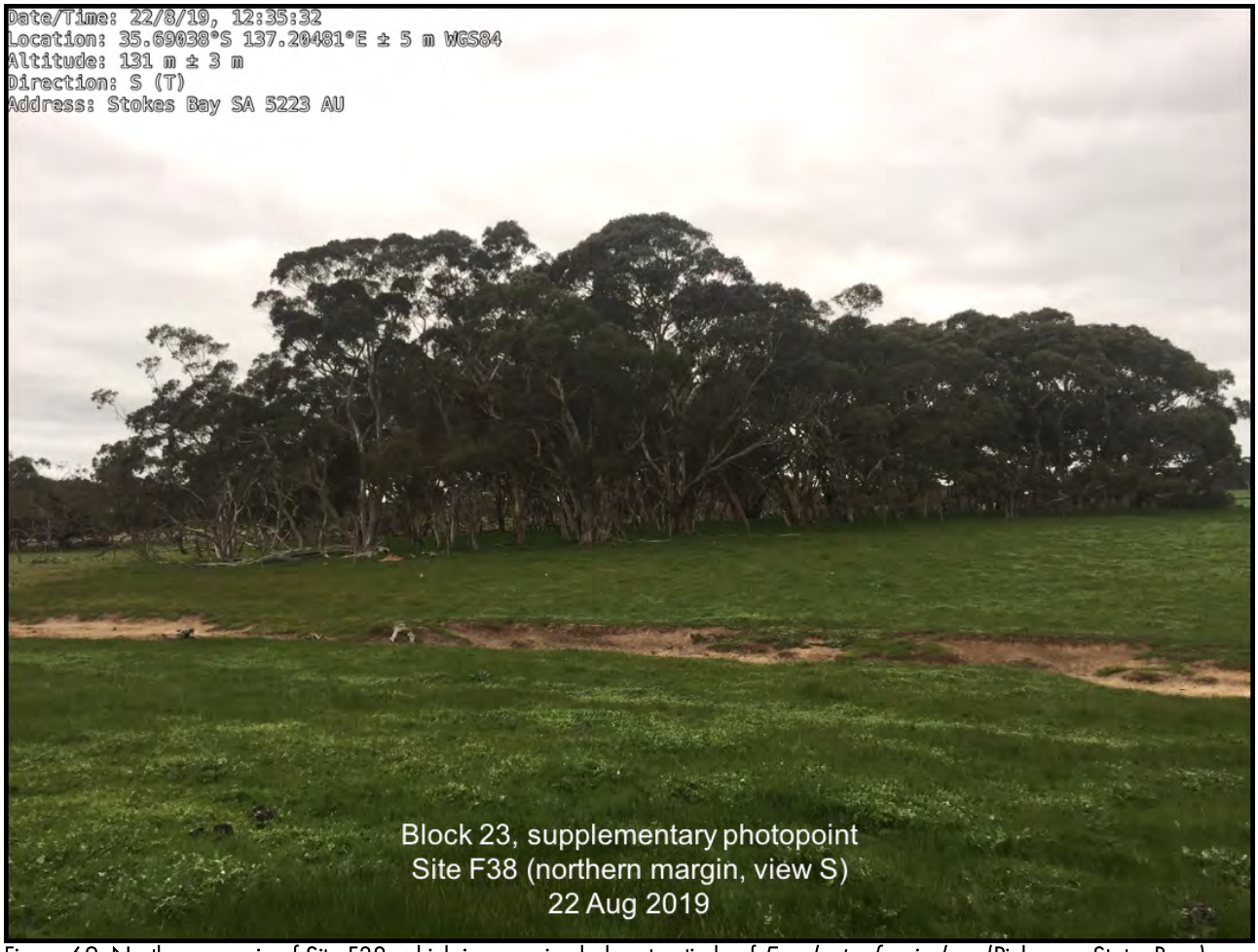


Figure 62. Northern margin of Site F38, which is comprised almost entirely of *Eucalyptus fasciculosa* (Pink gum, State: Rare) over pasture grass. Photopoint location and waypoint data are shown in Figure 38.

Block 24

Site F39

Figure 63. Northern margin of Site F39 is shown in the left panel. The effect of fencing on the growth of *Juncus pallidus* can be seen at the SW corner of the block (right panel). Photopoint locations and waypoint data are shown in Figure 39.

Block 25

Site F40

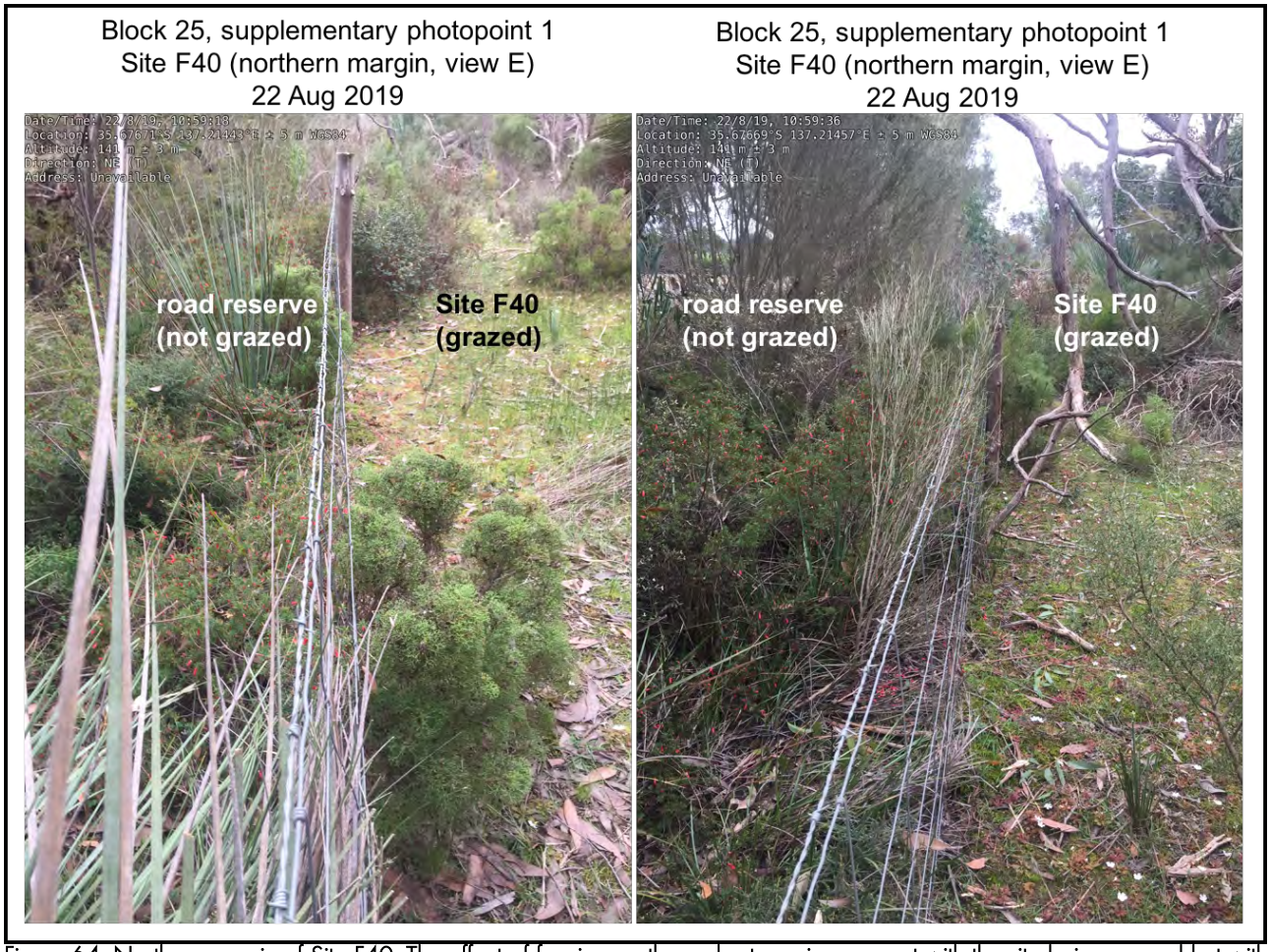


Figure 64. Northern margin of Site F40. The effect of fencing on the understorey is apparent with the site being grazed but with stock excluded from the roadside, which contains a dense shrub layer. This suggets that excluding stock from the site may lead to an imporement in the understorey which was quite variable. Photopoint locations and waypoint data are shown in Figure 40.

Block 26

Site F44

Figure 65: Effect of stock exclusioin on rushes (*Juncus pallidus*; left panel) and sedges (*Lepidosperma carphoides*, right panel), on the margins of Site F44. Photopoint locations and waypoint data are shown in Figure 41.

Block 27

Site F46

Figure 66. Site F46 showing the effects of grazing and introduction of pasture weeds in the understorey. This site consisted of a paddock treeline, fenced on onr side and containing low-moderate quality vegetation. Waypoint data: -35.68287°N, 137.19630°E.

Block 30

Site H2

Figure 67: Effect of stock exclusioin on ferns on the margin of Site H2. The right panel shows a small wetland area nearby, which contains the sedge, *Gahnia trifida* (in the foreground). Photopoint locations and waypoint data are shown in Figure 44.

Figure 68: Photographs of the entrance to active (left panel) and inactive (right panel) nest entran\ces of the Green carpenter bee (*Xylocopa* aeratus; Regionally Endangered). The nests have been made in the trunk of dead *Banksia ornata* located within Site H2. Test holes (where nest sunbsrate is tested but rejected) were also noted within H2 and photographed. It is hihgly likely that *X. aeratus* also occurs in nearby sites where *Banksia* occur. It was not able to be taken into account in SEB calculations because it is not available in the dop-down list of the fauna tab of the Bushland Assessment Excel templates. Waypoint data: near -35.68218°N, 137.17775°E.

Block 31

Site H3

Figure 69: Photographs of damage to *Eucalyptus leucoxylon* (SA blue gum) at Site H3, caused by koalas which are introduced to Kangaroo Island. Waypoint data: -35.68926°N, 137.19157°E.

Block 32

Site H6 (also showing Site H3)

Figure 70. Eastern margin of Site H6 (top panel) showing *Eucalyptus cladocalyx* (Sugar gum) that dominate the vegetation association. The bottom two panels show views more to the north with sites H6 an H3 both visible. Photopoint locations and waypoint data are shown in Figure 46.

Blocks 12 and 31

Sites F18 and H3

Figure 71: *Tachyglossus aculeatus multiaculeatus* (Kangaroo Island Short-beaked Echidna, EPBC: Endangered) was witnessed at Site F18 (Block 12) and Site H3 (Block 31), which are proposed for stock exclusion and heritage listing, respectively. Individuals were not seen at other sites although digging was quite widespread and the species wes scored as present if digging was noted at a site.

Results of EPBC Protected Matters Search

Australian Government
Department of the Environment and Energy

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

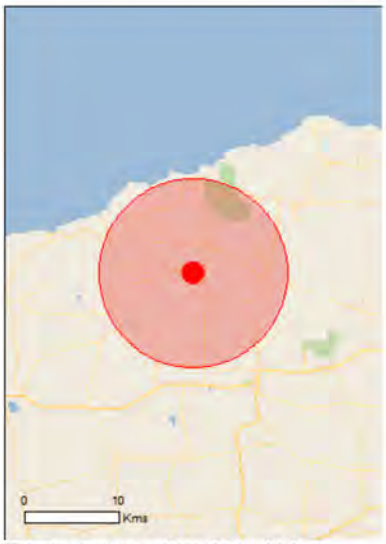
Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 03/09/19 13:46:55

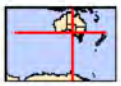
Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat
Acknowledgements



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

Coordinates
Buffer: 10.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	44
Listed Migratory Species:	41

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	70
Whales and Other Cetaceans:	12
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	12
Regional Forest Agreements:	None
Invasive Species:	45
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calyptorhynchus lathami halmaturinus Glossy Black-Cockatoo (Kangaroo Island), Glossy Black-Cockatoo (South Australian) [64436]	Endangered	Breeding known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat may occur within area
Limosa lapponica baueri Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat may occur within area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432]	Critically Endangered	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within

Name	Status	Type of Presence
		area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat likely to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Rostratula australis Australian Painted-snipe, Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche cauta cauta Shy Albatross, Tasmanian Shy Albatross [82345]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche cauta steadi White-capped Albatross [82344]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thinornis rubricollis rubricollis Hooded Plover (eastern) [66726]	Vulnerable	Species or species habitat known to occur within area
Zoothera lunulata halmaturina Bassian Thrush (South Australian) [67121]	Vulnerable	Species or species habitat likely to occur within area
Mammals		
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Isoodon obesulus obesulus Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern) [68050]	Endangered	Species or species habitat known to occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat likely to occur within area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Vulnerable	Species or species habitat likely to occur within area
Sminthopsis aitkeni Kangaroo Island Dunnart [300]	Endangered	Species or species habitat may occur within area
Tachyglossus aculeatus multiaculeatus Kangaroo Island Echidna [87597]	Endangered	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Plants		
Asterolasia phebalioides Downy Star-bush [3599]	Vulnerable	Species or species habitat may occur within area
Caladenia tensa Greencomb Spider-orchid, Rigid Spider-orchid [24390]	Endangered	Species or species habitat likely to occur within area
Cheiranthera volubilis Twining Finger Flower [3125]	Vulnerable	Species or species habitat likely to occur within area
Leionema equestre [64923]	Endangered	Species or species habitat known to occur within area
Pomaderris halmaturina subsp. halmaturina Kangaroo Island Pomaderris [21964]	Vulnerable	Species or species habitat likely to occur within area
Ptilotus beckerianus Ironstone Mulla Mulla [3787]	Vulnerable	Species or species habitat known to occur within area
Pultenaea villifera var. glabrescens Yellow Bush-pea, Splendid Bush-pea [10271]	Vulnerable	Species or species habitat known to occur within area
Thelymitra matthewsii Spiral Sun-orchid [4168]	Vulnerable	Species or species habitat may occur within area
Veronica derwentiana subsp. homalodonta Mount Lofty Speedwell [82836]	Critically Endangered	Species or species habitat known to occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Sharks		
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Name	Threatened	Type of Presence
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta Tasmanian Shy Albatross [89224]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Migratory Marine Species		
Balaena glacialis australis Southern Right Whale [75529]	Endangered*	Breeding known to occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species

Name	Threatened	Type of Presence
		habitat may occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat likely to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Migratory Terrestrial Species		
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat may occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat likely to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat likely to occur within area
Arenaria interpres Ruddy Turnstone [872]		Species or species habitat likely to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Calidris ruficollis Red-necked Stint [860]		Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area

Name	Threatened	Type of Presence
Pandion haliaetus		
Osprey [952]		Breeding known to occur within area
Tringa nebularia		
Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat likely to occur within area
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba		
Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
Ardea ibis		
Cattle Egret [59542]		Species or species habitat may occur within area
Arenaria interpres		
Ruddy Turnstone [872]		Species or species habitat likely to occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area
Calidris canutus		
Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area
Calidris ruficollis		
Red-necked Stint [860]		Species or species habitat likely to occur within area

Name	Threatened	Type of Presence
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Breeding known to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat may occur within area
Larus pacificus Pacific Gull [811]		Foraging, feeding or related behaviour known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat likely to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur

Name	Threatened	Type of Presence within area
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Thalassarche cauta Tasmanian Shy Albatross [89224]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thinornis rubricollis Hooded Plover [59510]		Species or species habitat known to occur within area
Thinornis rubricollis rubricollis Hooded Plover (eastern) [66726]	Vulnerable	Species or species habitat known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat may occur within area
Fish		
Acentronura australe Southern Pygmy Pipehorse [66185]		Species or species habitat may occur within area
Campichthys tryoni Tryon's Pipefish [66193]		Species or species habitat may occur within area
Filicampus tigris Tiger Pipefish [66217]		Species or species habitat may occur within area
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area
Hippocampus abdominalis Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area
Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area
Hypselognathus rostratus Knifesnout Pipefish, Knife-snouted Pipefish [66245]		Species or species habitat may occur within area
Kaupus costatus Deepbody Pipefish, Deep-bodied Pipefish [66246]		Species or species habitat may occur within

Name	Threatened	Type of Presence
		area
Leptoichthys fistularius Brushtail Pipefish [66248]		Species or species habitat may occur within area
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area
Solegnathus robustus Robust Pipehorse, Robust Spiny Pipehorse [66274]		Species or species habitat may occur within area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Stipecampus cristatus Ringback Pipefish, Ring-backed Pipefish [66278]		Species or species habitat may occur within area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area
Vanacampus poecilolaemus Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area
Vanacampus vercoi Verco's Pipefish [66286]		Species or species habitat may occur within area
Mammals		
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within

Name	Threatened	Type of Presence
		area
Arctocephalus pusillus Australian Fur-seal, Australo-African Fur-seal [21]		Species or species habitat may occur within area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Vulnerable	Species or species habitat likely to occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area

Whales and other Cetaceans [Resource Information]

Name	Status	Type of Presence
Mammals		
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area
Delphinus delphis Common Dophin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat likely to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves [Resource Information]

Name	State
Lathami	SA
Unnamed (No.HA1048)	SA
Unnamed (No.HA1296)	SA
Unnamed (No.HA1358)	SA
Unnamed (No.HA205)	SA
Unnamed (No.HA207)	SA
Unnamed (No.HA481)	SA
Unnamed (No.HA600)	SA
Unnamed (No.HA670)	SA
Unnamed (No.HA719)	SA
Unnamed (No.HA891)	SA
Unnamed (No.HA974)	SA

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Alauda arvensis Skylark [656]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Carduelis chloris European Greenfinch [404]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Meleagris gallopavo Wild Turkey [64380]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur

Name	Status	Type of Presence within area
Pavo cristatus Indian Peafowl, Peacock [919]		Species or species habitat likely to occur within area
Phasianus colchicus Common Pheasant [920]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Mammals		
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Plants		
Alternanthera philoxeroides Alligator Weed [11620]		Species or species habitat likely to occur within area
Annona glabra Pond Apple, Pond-apple Tree, Alligator Apple, Bullock's Heart, Cherimoya, Monkey Apple, Bobwood, Corkwood [6311]		Species or species habitat likely to occur within area
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Cabomba caroliniana Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera subsp. rotundata Bitou Bush [16332]		Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Cryptostegia grandiflora Rubber Vine, Rubbervine, India Rubber Vine, India Rubbervine, Palay Rubbervine, Purple Allamanda [18913]		Species or species habitat likely to occur within area
Cylindropuntia spp. Prickly Pears [85131]		Species or species habitat likely to occur within area
Cytisus scoparius Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		Species or species habitat likely to occur within area
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Hymenachne amplexicaulis Hymenachne, Olive Hymenachne, Water Stargrass, West Indian Grass, West Indian Marsh Grass [31754]		Species or species habitat likely to occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Mimosa pigra Mimosa, Giant Mimosa, Giant Sensitive Plant, ThornySensitive Plant, Black Mimosa, Catclaw Mimosa, Bashful Plant [11223]		Species or species habitat likely to occur within area
Nassella neesiana Chilean Needle grass [67699]		Species or species habitat likely to occur within area
Olea europaea Olive, Common Olive [9160]		Species or species habitat may occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Parkinsonia aculeata Parkinsonia, Jerusalem Thorn, Jelly Bean Tree, Horse Bean [12301]		Species or species habitat likely to occur within area
Parthenium hysterophorus Parthenium Weed, Bitter Weed, Carrot Grass, False Ragweed [19566]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Prosopis spp. Mesquite, Algaroba [68407]		Species or species habitat likely to occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss,		Species or species

Name	Status	Type of Presence
Kariba Weed [13665]		habitat likely to occur within area
Tamarix aphylla Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar [16018]		Species or species habitat likely to occur within area
Ulex europaeus Gorse, Furze [7693]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-35.70008 137.20353

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-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
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-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

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Please feel free to provide feedback via the Contact Us page.

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