Gungahlin Vegetation Survey and Mapping Report

Ecological Communities and Threatened Species within the Gungahlin Strategic Assessment Area.

Prepared for
Conservation Planning and Research, ACT Government (CPR)

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Prepared by	Matthew Dowle
	Bruce Mullins
	Martin Sullivan
	Joanne Daly
	Liz Norris
	Ryan Smithers
Approved by	Bruce Mullins
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1 Introduction

1.1 BACKGROUND

Eco Logical Australia Pty Ltd was commissioned by Conservation Planning and Research, ACT Government (CPR) to undertake vegetation surveys and mapping services for the Gungahlin Strategic Assessment area. CPR required field surveys to determine the classification, distribution, condition of vegetation and habitat resources for this area.

This field surveys and mapping conducted would assist in identifying areas of high biodiversity value and potential development constraints within the Gungahlin Strategic Assessment area. This information would ultimately serve a number of purposes for the ACT Government, such as informing future land-use planning.

1.2 STUDY AREA

The study area incorporates approximately 2,492 ha of land in the Gungahlin Strategic Assessment area. For a detailed map of the study area refer to Figure 2. This area includes the site between Mt Majura and Goorooyaroo, Kinlyside, One-tree Hill, Taylor, Throsby and a range of short-term leases north of Gungahlin. The area is roughly bordered by the north-western and north-eastern ACT border and Horsepark Drive in the south.

The sites topography is dominated by the ridge, One Tree Hill in the west and a wide valley flat to the east. It consists primarily of agricultural land used for grazing on native and exotic pasture. As a result, much of the land within the study area has previously been cleared for cattle and sheep grazing. A number of Eucalypt forest plantations exist in the northern section of the study area.

1.3 STUDY AIMS

The aim of the study was to conduct an ecological assessment of the Gungahlin Strategic Assessment through vegetation surveys and mapping services. The field surveys were to be conducted in accordance with the *Survey Guidelines for Determining Lowland Vegetation Classification and Condition in the ACT*. The study specifically aimed to:

- determine the presence of any ecological communities listed under the *Environment Protection and Biodiversity Conservation Act 1999*, such as *Natural Temperate Grasslands of the Southern Tablelands and the ACT* (NTG) and *White Box – Yellow Box – Blakely's Red Gum Grassy woodland and derived native grasslands* (Box-Gum Woodland);
- assess the vegetation against the definition of native vegetation under the *Nature Conservation Act 1980*;
- classify all vegetation to its ACT climax vegetation community;
- assess and map the extent, condition and habitat resources for each of the vegetation polygons; and
- identify any threatened or rare flora that may potentially occur within the area.

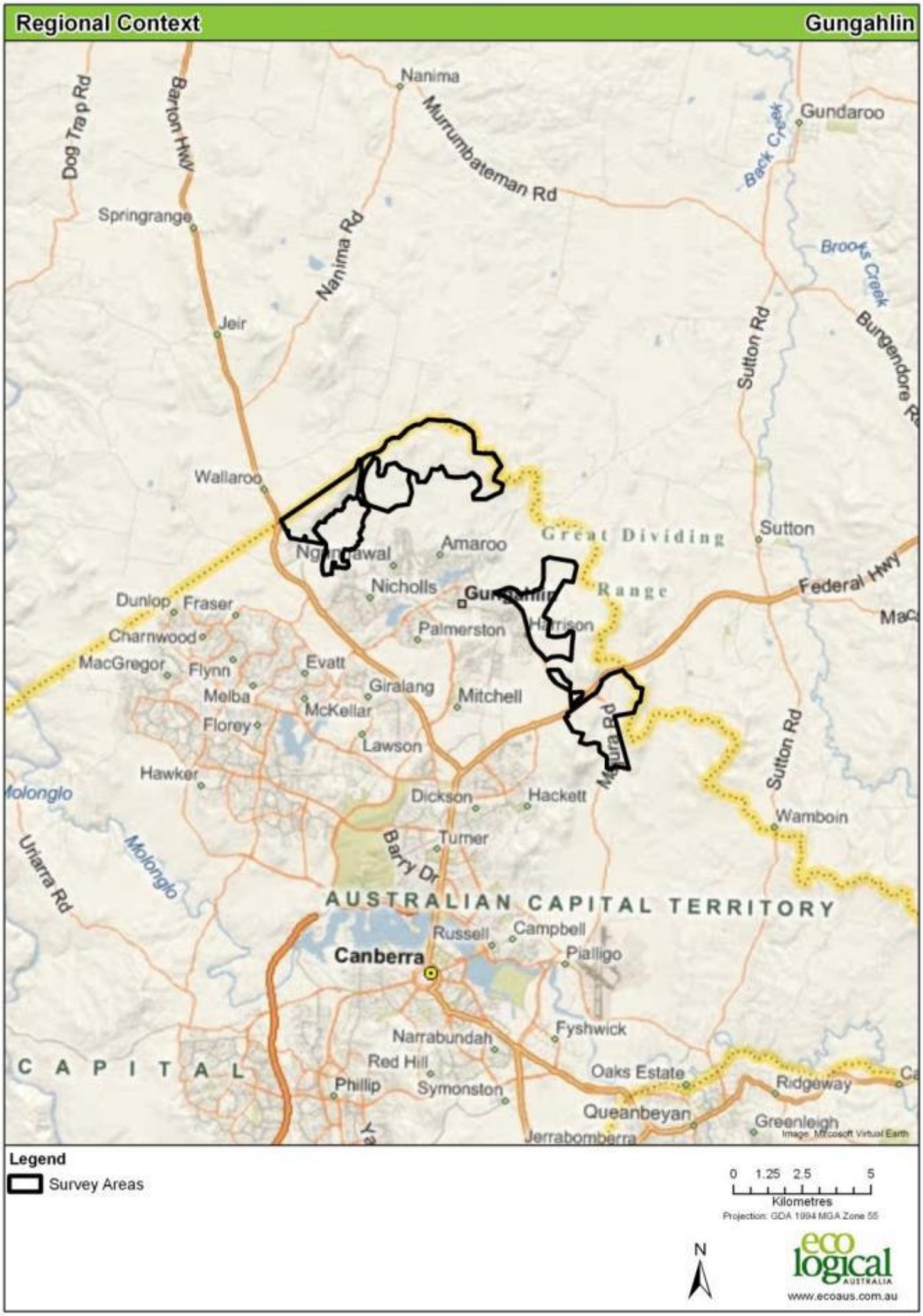

Figure 1: Regional overview of the study area

Figure 2: Detailed overview of the study area

2 Legislative Context

2.1 COMMONWEALTH

2.1.1 Environment Protection Biodiversity Conservation Act 1999

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides a national scheme for protecting the environment and conserving biodiversity values.

Approval from the Commonwealth Environment Minister is required under the EPBC Act if an action (which can include a project, development, undertaking or activity) will, or is likely to, have a significant impact on matters considered to be of national environmental significance (NES matters). NES matters relevant to the proposal include species and ecological communities that are listed under the Act. NES matters require consideration during planning and construction for indirect and direct impacts and an assessment to determine the likelihood of the significance of those impacts under the EPBC Act.

Two endangered ecological communities are likely to occur within the study area:

- *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland* (Box-Gum Woodland); and
- *Natural Temperate Grassland of the Southern Tablelands of NSW and the Australian Capital Territory* (Natural Temperate Grassland).

These ecological communities are described briefly below. Other matters of NES may also occur within the study area but have not been described in detail in this report. These include, but are not limited to:

- *Synemon plana* (Golden Sun Moth);
- *Aprasia parapulchella* (Pink-tailed Worm Lizard);
- threatened avifauna; and
- threatened flora.

Box-Gum Woodland

White Box – Yellow Box – Blakely's Red Gum Grassy Woodland (Box-Gum Woodland) is listed as a Critically Endangered ecological community under the EPBC Act. This ecological community can occur either as woodland or derived grassland from which the trees have been removed. According to the EPBC Act Listing Advice (Threatened Species Scientific Committee, 2006):

> *Box–Gum Grassy Woodlands and Derived Grasslands are characterised by a species-rich understorey of native tussock grasses, herbs and scattered shrubs, and the dominance, or prior dominance, of White Box, Yellow Box or Blakely's Red Gum trees.*

Sites dominated by other tree species that do not have Yellow Box, White Box or Blakely's Red Gum as co-dominants are not considered to be part of the ecological community.

Box-Gum Woodland can provide important habitat for a large number of plants and animals, including rare and threatened species. This ecological community was once widespread across eastern Australia but now less than 5 percent remains in good condition of which most occur is small isolated patches.

EPBC Act Definition and Mapping of Box-Gum Woodland

A description of Box-Gum Woodland as listed under the EPBC Act is provided in two documents:

- the EPBC Act Listing Advice for Box-Gum Woodland (Threatened Species Scientific Committee, 2006); and
- an EPBC Act Policy Statement for Box-Gum Woodland (DEH, 2006).

The Listing Advice provides the legal definition and criteria for the ecological community, whereas the Policy Statement provides guidance about the ecological community for the public.

It is important to note that the identification and mapping of Box-Gum Woodland in this project is based on the legal determination presented in the Listing Advice. This is due to a fundamental difference between the Listing Advice and the Policy Statement. The Policy Statement requires that criteria relating to the understorey must be applied:

to the 0.1 hectare of your patch that contains the most native species in the ground layer.

This statement does not align with the definition of the ecological community provided in the Listing Advice which applies to the understorey criteria to the <u>whole</u> of a patch. There is no requirement in the legal Listing Advice to focus on the most diverse 0.1 ha area within a patch.

Given this inconsistency, the mapping of Box-Gum Woodland in this project is based on the definition of the ecological community contained within the Listing Advice from the Threatened Species Scientific Committee to the Commonwealth Minister for the Environment and is consistent with the legal instrument for this community as defined under the EPBC Act.

Natural Temperate Grasslands

NTG is listed as an Endangered ecological community under the EPBC Act. According to the Listing Advice (Endangered Species Scientific Subcommittee, 2000):

> *The community is dominated by moderately tall (25-50 cm) to tall (50 cm-1 m), dense to open tussock grasses with up to 70% of species being forbs. The community may be treeless or contain up to 10% cover of trees, shrubs or sedges. In the Southern Tablelands natural temperate grasslands are located at altitudes between 560 and 1200 metres in valleys influenced by cold air drainage and in broad plains. The community occurs within the geographical region of the Southern Tablelands of NSW and ACT, which extends southwards from the Abercrombie River to the Victorian Border, from Boorowa and Jindabyne to the west and Goulburn to Braidwood and Bombala to the east.*

There is no EPBC Act Policy Statement for this ecological community. Thus, the process for determining the presence of Natural Temperate Grassland within the study area was assessed against the definition provided in the Listing Advice.

2.2 AUSTRALIAN CAPITAL TERRITORY

2.2.1 Nature Conservation Act 1980

The purpose of the *Nature Conservation Act 1980* (NC Act) is to: "make provision for the protection and conservation of native animals and native plants, and for the reservation of areas for those purposes". The NC Act legislation provides a framework to create and manage protected areas, manage and protect native wildlife; and manage the spread of non-native wildlife.

The NC Act provides authority for the Conservator of Flora and Fauna to manage land designated as Public Land reserved for conservation of the natural environment. The NC Act allows for specific measures to be implemented in conservation lands or reserves to promote the conservation of a species or community, such as a restriction of access to important land. It provides a listing of threatened species and ecological communities within the ACT. A range of threatened flora and fauna listed under the NC Act have the potential to occur within the study area.

The NC Act is applicable to land which is used by, or intended to be used by the Commonwealth. The NC Act requires that an action with the potential to impact (directly or indirectly) listed ecological communities, threatened species or their habitat to be independently assessed.

Definitions as listed under the *Nature Conservation Act 1980* that may have relevance to this study have been provided below.

Native Vegetation

Native Vegetation is defined in the NC Act as occurring if:

- trees or shrubs indigenous to the area have a canopy cover of 10% or greater in any stratum; or
- native plants indigenous to the area comprise 50% or more of the cover of the groundlayer (grasses, small shrubs, forms, sedges).

Native vegetation, in relation to an area, means any of the following kinds of vegetation indigenous to the area:

a) Trees:
b) Understorey plants;
c) Groundcover consisting of any kind of grass or herbaceous vegetation;
d) Plants occurring in a wetland or stream.

Associated with the native vegetation definition is the definition of clearing native vegetation.

Clearing Native Vegetation includes any of the following;

a) Cutting down, felling, thinning, logging or removing native vegetation;
b) Burning native vegetation;
c) Doing anything else that kills or is likely to kill native vegetation.

Native vegetation is cleared in an area if vegetation cleared in the area is substantially native vegetation.

Indigenous vegetation for the purposes of this report means any vegetation that is native to and originated from the Australian Capital Territory.

3 Methodology

The methods for field surveys were provided to Eco Logical Australia by CPR. The methods are detailed in '*Survey Guidelines for determining lowland vegetation classification and condition in the ACT'* (CPR 2010). Data sheets for field surveys were also provided by CPR (Appendices C to E).

Baseline GIS mapping was supplied in conjunction with the survey guidelines that divided the study area into vegetation polygons. Vegetation polygons were then assessed according to the appropriate methodology outlined in the survey guidelines.

The survey guidelines outlined methods for surveying woodlands and forest or grasslands, determining the presence of native vegetation as defined under the NC Act, information to be collected when threatened or rare plants are recorded, classifying vegetation and identifying fauna habitat (specifically partially embedded and surface rock).

The survey guidelines apply to lowland vegetation, which is vegetation that is below 1000 metres above sea level.

3.1 VEGETATION ASSESSMENTS

The vegetation surveys were undertaken within vegetation polygons identified by a combination of ACT Government vegetation mapping, aerial photograph interpretation and mapping by the Conservation Council (2008). Delineation of vegetation polygons (or patches) was based on the spatial arrangement of the canopy and the type and general condition of the vegetation (i.e. did it appear to be native dominated), which was often strongly influenced by landuse practices (e.g. level of grazing, history of disturbance, location of fence lines).

Vegetation surveys were conducted to:

- assess the presence of an endangered ecological community under the EPBC Act;
- determine whether vegetation polygons met the native vegetation definition as defined under the NC Act;
- collect data to determine the ACT climax vegetation community and support mapping;
- record rare and threatened flora species; and
- assess fauna habitat resources.

Every vegetation polygon was traversed to classify the vegetation to its ACT Climax Vegetation Community and to determine whether it was native vegetation as defined under the NC Act.

In polygons that were deemed to be a natural woodland community or potential Box-Gum Woodland (including Box-Gum Woodland Derived Grasslands), data collected was conducted by a vegetation traverse as detailed under the methods for woodlands and forests in the survey guidelines. In polygons that were deemed to be a natural grassland community, the data collected was conducted by a vegetation quadrat as detailed under the methods for grasslands in the survey guidelines.

The grassland method applied to areas with a tree canopy cover less than 10% (except for Box-Gum woodlands) and woodlands and forest method is applied to all Box-Gum Woodlands and vegetation with a tree canopy cover greater than 10%.

In some large polygons, multiple traverses were required to obtain the appropriate data. This was also the case when GIS mapping did not truly reflect the vegetation communities and/or condition on the ground. These polygons were subsequently split and data collected in each new polygon.

All vegetation assessments locations have been provided in Figure 3 and Figure 4.

3.1.1 Endangered Ecological Communities

Methods for Woodlands (Traverse)

A traverse (or random walk) was conducted within each polygon with a tree cover greater than 10% or if *Eucalyptus melliodora* (Yellow Box) or *E. blakelyi* (Blakely's Red Gum) was or once was the dominant tree species.

A traverse no shorter than 100m in length was conducted through woodland patches to collect floristic and vegetation structural data pertaining to the vegetation community. The traverse paid particular attention to anomalous sections such as rocky rises on a flat surface or patches of shrubs or trees to ensure the maximum diversity of species within a patch was determined. A species list was compiled using standard proformas provided (Appendix B) to record the species present and determine a cover abundance rating based on the Braun-Blanquet scale. A GPS recording was taken to identify the start and end point of the traverse. Specimens not readily identifiable in the field were appropriately labelled, pressed and later identified. All data was subsequently entered into an excel spreadsheet.

The floristic information gathered from the traverse was used to:

- assess the patch against listing criteria for endangered ecological communities listings;
- assess the patch against the *Nature Conservation Act 1980* listing criteria for native vegetation; and
- determine the vegetation community present.

All data was subsequently entered into an excel spreadsheet

Methods for Grasslands (Quadrat)

A 20 x 20 metre quadrat was conducted in areas with a tree canopy of 10% or less, unless the dominant tree species were Yellow Box or Blakely's Red Gum. Quadrats were conducted in parts of the vegetation polygon where the groundcover had the highest diversity of native species. In large polygons multiple quadrats were conducted to adequately capture the values of the site.

From within each 20 x 20 metre quadrat, an inventory of flora species was created and assigned a cover abundance score using the Braun-Blanquet scale (Appendix B). A GPS recording was taken from the centre of each quadrat. Specimens not readily identifiable in the field were appropriately labelled, pressed and later identified in the laboratory. All data was subsequently entered into an excel spreadsheet.

The floristic information gathered from the traverse was used to:

- assess the patch against listing criteria for endangered ecological communities listings;

- assess the patch against the *Nature Conservation Act 1980* listing criteria for native vegetation; and
- determine the vegetation community present.

3.1.2 Native Vegetation (Step Point Transect)

Step point transects were undertaken in each vegetation polygon using the provided proformas (Appendix C). Step point transects were conducted along the same vegetation traverse or adjacent to the vegetation quadrat conducted immediately prior as described above.

Fifty data points (steps) were collected along a transect running through an area representative of the vegetation community. Each sample point was recorded as its appropriate category on the proformas (e.g. native perennial, exotic broadleaf, litter, etc). The fifty sample points were extrapolated to provide a percentage cover of each category.

A polygon was considered to be native vegetation as defined in the NC Act if:

- Trees or shrubs indigenous to the area have a canopy cover of 10% or more of greater in any stratum, or
- Native plants indigenous to the area comprise 50% or more of the cover of the groundlayer (grasses, small shrubs, forms, sedges).

3.1.3 Vegetation Classification (Community Structure)

Each polygon of native vegetation was classified according to the ACT described vegetation communities. The vegetation community classification applies to the most likely climax state (prior to 1750). This is determined by comparing its current tree canopy cover, the presence of different structural layers, the species composition of the structural layers and landscape position.

The climax state of the vegetation community was classified by determining the dominant species (and percent cover) in each stratum. Data was recorded on the provided proformas (Appendix D). The floristic composition and native vegetation status as described above also assisted in determining the ACT climax vegetation community (Appendix E).

3.1.4 Threatened Flora Species

The presence of threatened flora species within the study area was assessed through the vegetation traverses or quadrats described above, or through incidental observations. The location of each threatened species was recorded using a GPS and subsequently mapped.

3.2 HABITAT RESOURCES

Woodlands and grasslands in the Gungahlin area are likely to support a diversity of animals, including birds, reptiles, arboreal mammals and invertebrates. In the woodland communities, a structural complexity is created by the presence of tree hollows, fallen timber, trees of different ages, a mid-level shrub layer and a grassy understorey. These areas are considered to have high ecological value as they provide nesting sites, shelter and food resources for a variety of species (ACT Government, 2004).

To compliment the vegetation assessment, some habitat resources were recorded during the field surveys and mapped accordingly.

3.2.1 Hollow-bearing Trees

During the vegetation traverses, the relative abundance of hollow-bearing trees (HBT) was noted. Relative abundance was recorded (rather than absolute numbers) due to the large number of trees in some polygons. It's important to note that not all hollow-bearing trees within the study area were observed as the assessment was confined to the vegetation traverses. However, data can be extrapolated across the broader site according to the similarity in vegetation community, vegetation structure, and age of mature trees.

The relative abundance of hollows was scored as:

- Low - meaning that tree hollows were rarely observed amongst the trees present within the patch;
- Medium - meaning that tree hollows were occasionally observed amongst the trees within the patch; or
- High - meaning that tree hollows were common amongst trees within the patch.

The hollow-bearing tree assessment was conducted for all wooded vegetation.

3.2.2 Rocky Habitat

Surface rock and the cavity between rocks is an important habitat component for many reptile, amphibians and small mammal species. Areas with slightly embedded surface rock, especially in the range of 10 x 10 cm to 40 x 40 cm square are particularly important for reptiles. An assessment of the presence of these types of rocks was made during the vegetation assessments of the polygons. It's important to note that not all rocky habitats within the study area were observed as the assessment was confined to the vegetation traverses and quadrats.

The relative abundance of rocky habitat was scored as:

- Low - meaning that rocky habitat was either absent, highly scattered or occurred in low abundance;
- Medium - meaning that rocky habitat was present in a moderate abundance and generally not scattered; or
- High - meaning that rocky habitat was extensive.

3.3 VEGETATION MAPPING

All vegetation assessments were mapped using the projected coordinate system GDA 1994 MGA Zone 55. Mapped information was obtained by a combination of GPS recordings, mapping data provided and field observation. Mapped information includes the location of vegetation polygons, survey locations, endangered ecological communities, native vegetation, climax vegetation community, rare or threatened species and habitat features.

3.4 LIMITATIONS

3.4.1 Vegetation

This study was not intended to provide an inventory of all species present within the study area but instead aimed to provide an overall assessment of the ecological values with particular emphasis on the native vegetation status, endangered ecological communities (EPBC Act) and condition.

Some flora could not be identified to species level due to insufficient diagnostic material (such as flowers and fruits). Some species were subsequently identified to Genus level only. However, in all cases a sufficient level of identification to determine the native or exotic status of individuals could be made for an assessment against the native vegetation status of the site.

The definition for native vegetation under the *Nature Conservation Act 1980* does not distinguish between annual and perennial vegetation. This allows a potential bias in classifying areas of native vegetation according to the time of the year in which the area was surveyed. Survey during the autumn period allowed an assessment against perennial vegetation due to the low abundance of ephemeral species. For this report, areas were surveyed strictly against the *Nature Conservation Act 1980* definition.

Eco Logical Australia did not access to two small areas in the Mt Majura to Goorooyaroo site due to a lack of permission from property owners. Block 574 was not accessed because Eco Logical Australia could not contact the property owner after significant attempts to do so. The other area south of Horsepark Drive and west of the Federal Hwy did not have contact information. This block consists primarily of a house and property and is most likely going to contain highly modified vegetation.

3.4.2 Methodology

The grassland methodology was intended to be used only in areas with a tree canopy cover less than 10% (except for Box-Gum woodlands and derived grasslands). It was determined that there were no areas that reflected a true grassland community (that was not exotic pasture). Vegetation assessments were therefore conducted using the woodland methodology only.

3.4.3 GIS Mapping

Eco Logical Australia understands that the GIS mapping was provided as a tool to determine what and where vegetation assessments were to be conducted. A vegetation assessment was to be conducted within each vegetation polygon. It was found during the early stages of the vegetation assessments that the GIS mapping provided often did not adequately represent the vegetation features on the ground. This made it difficult to provide a vegetation assessment in each polygon of the study area that was truly reflective of the vegetation communities and conditions present. Therefore, the ecologists used the GIS mapping as a starting point for each assessment, however, made adjustments to vegetation boundaries whilst in the field as required, and undertook surveys in the revised polygons according to the original methodology. The ecologists used the vegetation features on ground to primarily determine where polygon boundaries and vegetation assessments were to be conducted.

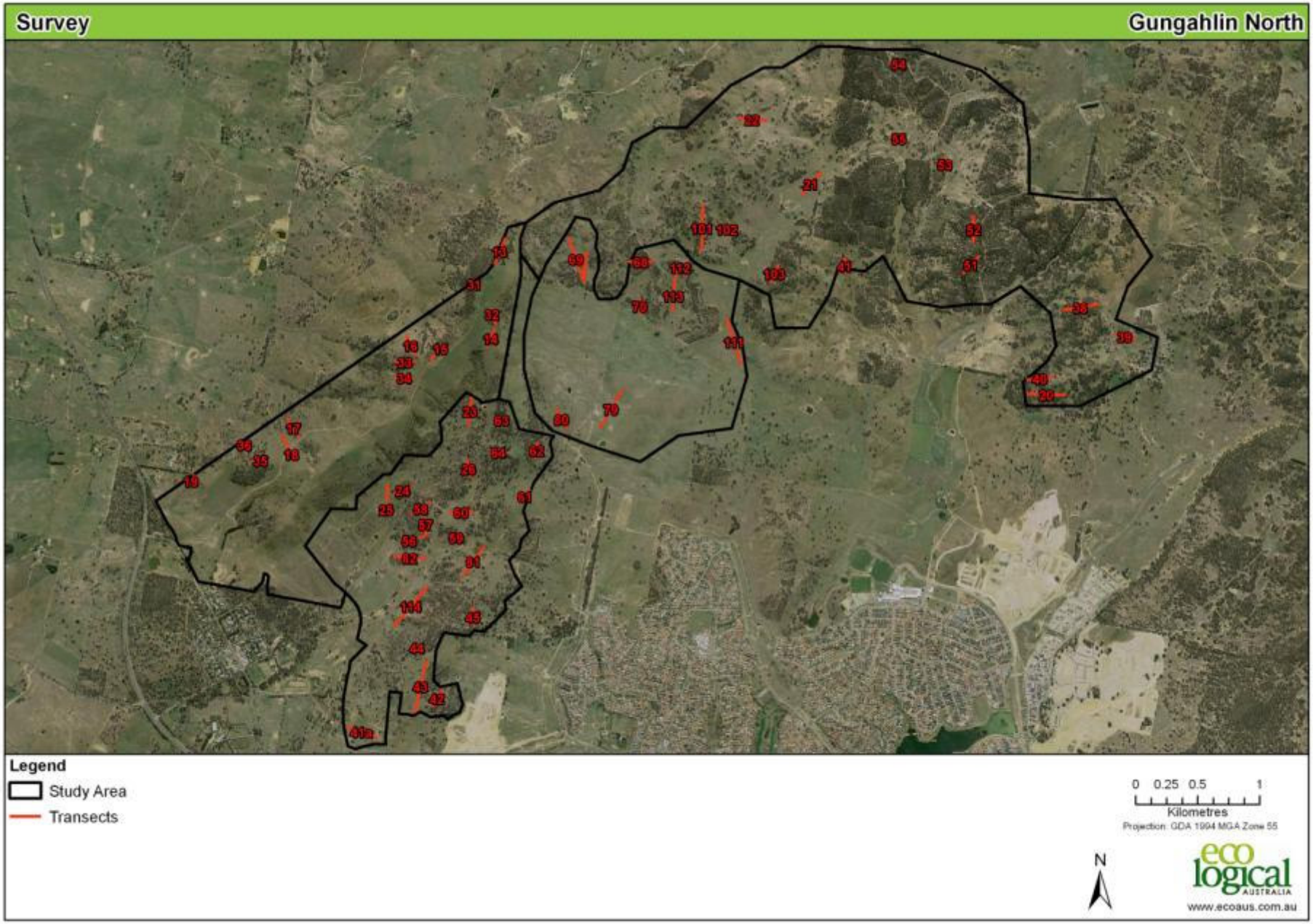

Figure 3: Vegetation survey locations for One Tree Hill, Kinlyside, Taylor and North Short Leases

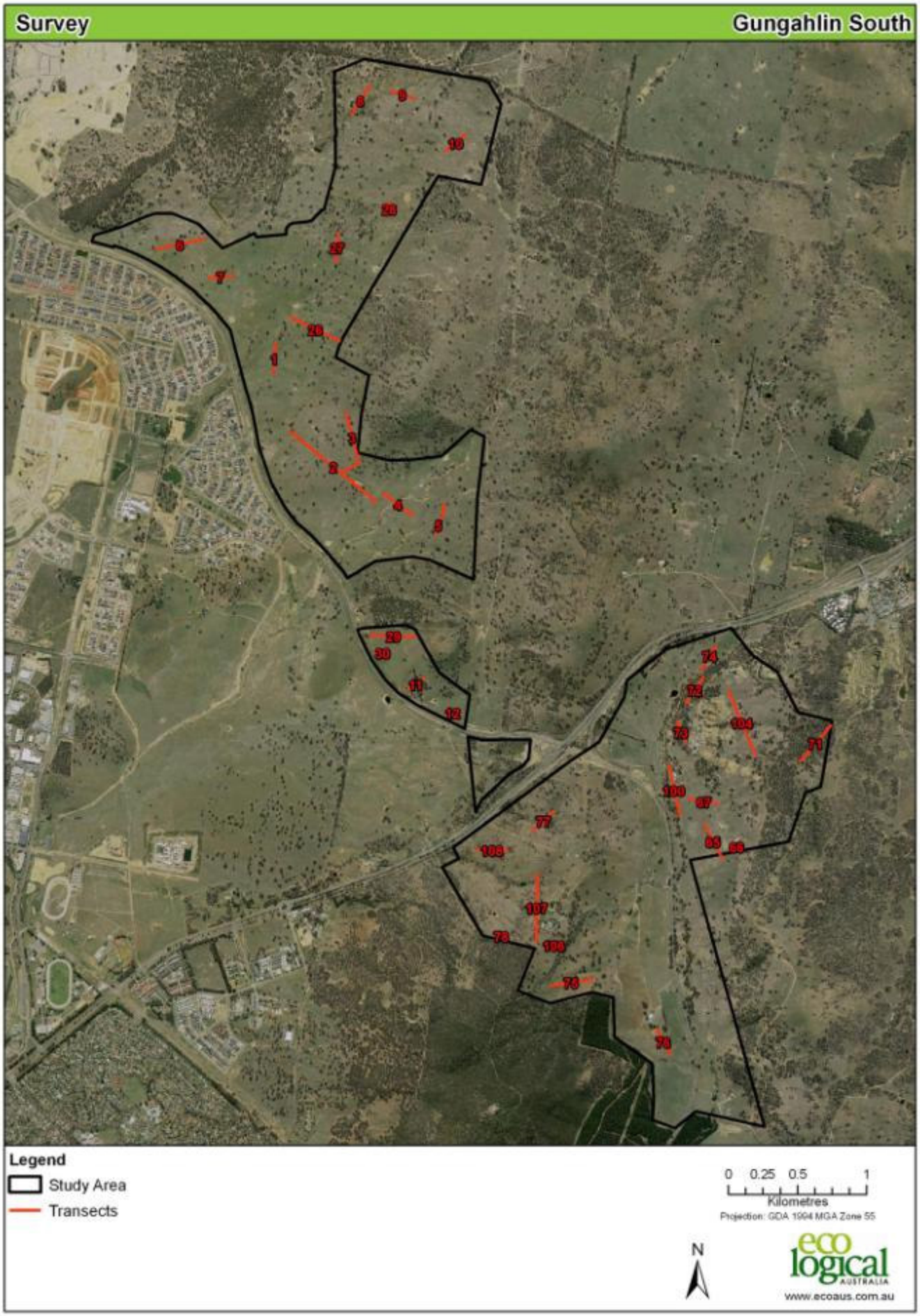

Figure 4: Vegetation survey locations for Throsby and Mt Majura to Goorooyaroo

4 Results

4.1 VEGETATION ASSESSMENTS

4.1.1 Endangered Ecological Communities

One endangered ecological community (Box-Gum Woodland) listed under the EPBC Act was recorded within the study area.

White Box - Yellow Box – Blakely's Red Gum grassy woodland and derived native grasslands (Box-Gum Woodland)

Box-Gum Woodland is a vegetation community characterised by a canopy dominated by either *Eucalyptus albens* (White Box), *E. melliodora* (Yellow Box) or *E. blakelyi* (Blakely's Red Gum), a scant shrub layer and ground layer comprising native grasses and herbs.

To classify as Box-Gum Woodland under the EPBC Act, the ground layer must be dominated by perennial native vegetation (i.e. greater than 50%), and the canopy must be dominated by, or once dominated by prior to European settlement, one of the characteristic canopy species (i.e. they can be treeless).

Under the Act, the community occurs in a range of condition types:

1. Patches greater than 0.1 ha, with a diverse ground layer made up of 12 of more native non-grass species, including a pre-defined 'important' species. The Act nominates what an important species is, and include many species that suffer from prolonged grazing.
2. For patches that do not satisfy criteria 1, patches greater than 2 ha than include at least 20 mature trees per hectare.
3. For patches than do not satisfy criteria 1 or 2, patches greater than 2 ha, with regeneration of the canopy.

Not all patches containing the characteristic Box-Gum Woodland canopy species met the criteria.

A total of approximately 525.50 ha of EPBC Act Box-Gum Woodland was identified across the study area (Figure 5 and Figure 6).

Box-Gum Woodland varied greatly across the study area in that some patches contained a canopy and/or a regenerating canopy, while others do not and occur as Derived Native Grassland (Secondary Grassland). For many patches of Box-Gum Woodland and Derived Native Grassland, the majority of the patch comprised native perennial grasses with a low abundance of exotic annual grasses. Wooded examples were of an open structure across agricultural land, with limited woody debris on the ground, a low to moderate cover of grasses and forbs, and zero to few shrubs. However, some areas exhibited high native diversity, whilst others had larger infestations of exotic weed species.

There can be considerable difficulty in determining whether some patches of Derived Native Grassland were originally Box-Gum Woodland and not another vegetation type. Wherever possible, the project team used the presence of isolated trees and topographic location to assist in determining the likely original community.

There is some conflict between the mapping presented in this report and that of the Box-Gum Woodland mapped by the ACT Government. The ACT listed Box-Gum Woodland uses slightly different and less stringent criteria to define vegetation as Box-Gum Woodland. Patches of ACT Box-Gum Woodland that do not meet the EPBC Act criteria have a predominantly native understorey, but:

- do not contain 12 native non-grass perennial understorey species; and/or
- do not have a regenerating canopy of the signature overstorey species; or
- do not contain 20 mature trees per hectare.

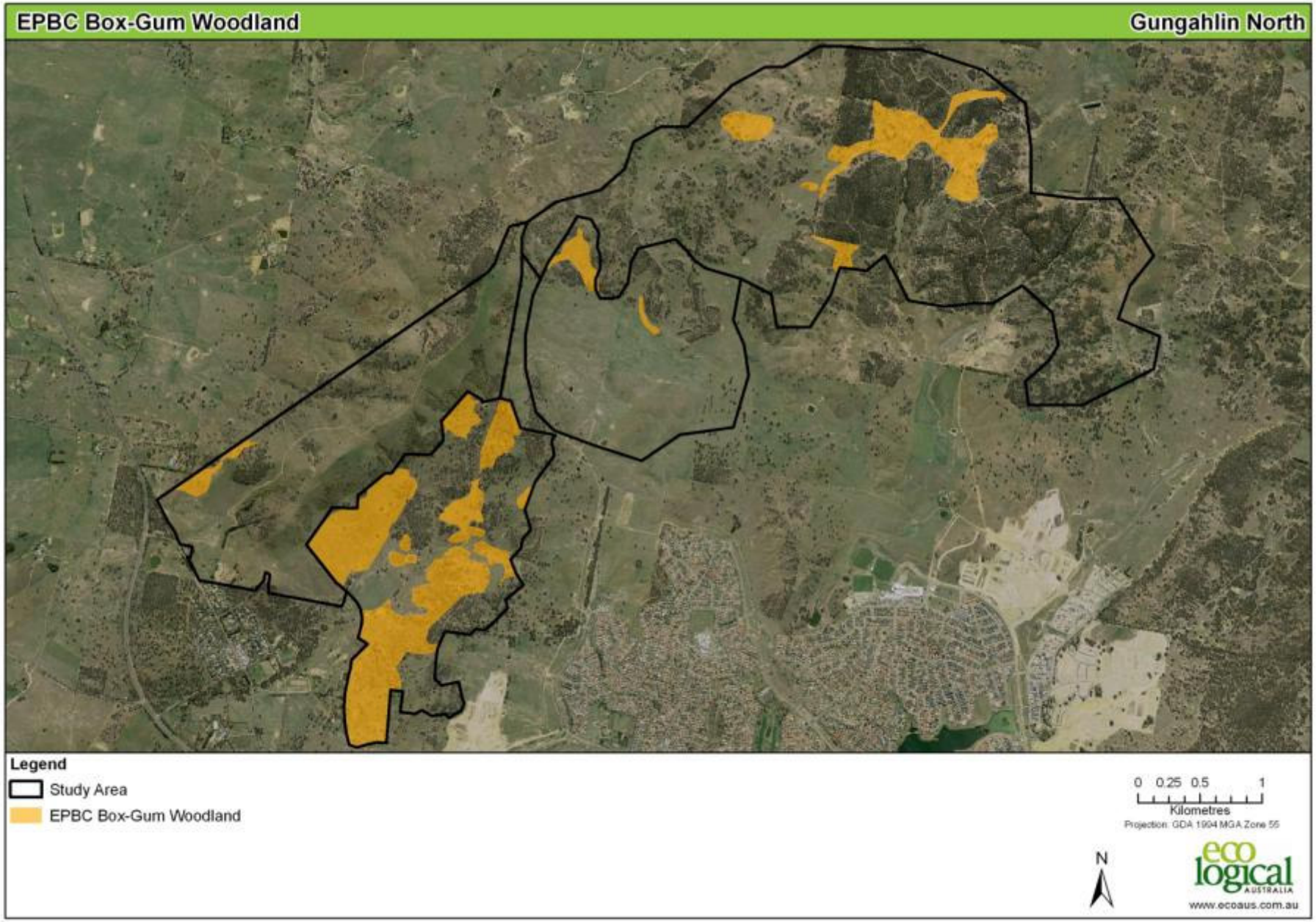

Figure 5: Box-Gum Woodland and threatened species for One Tree Hill, Kinlyside, Taylor and North Short Leases

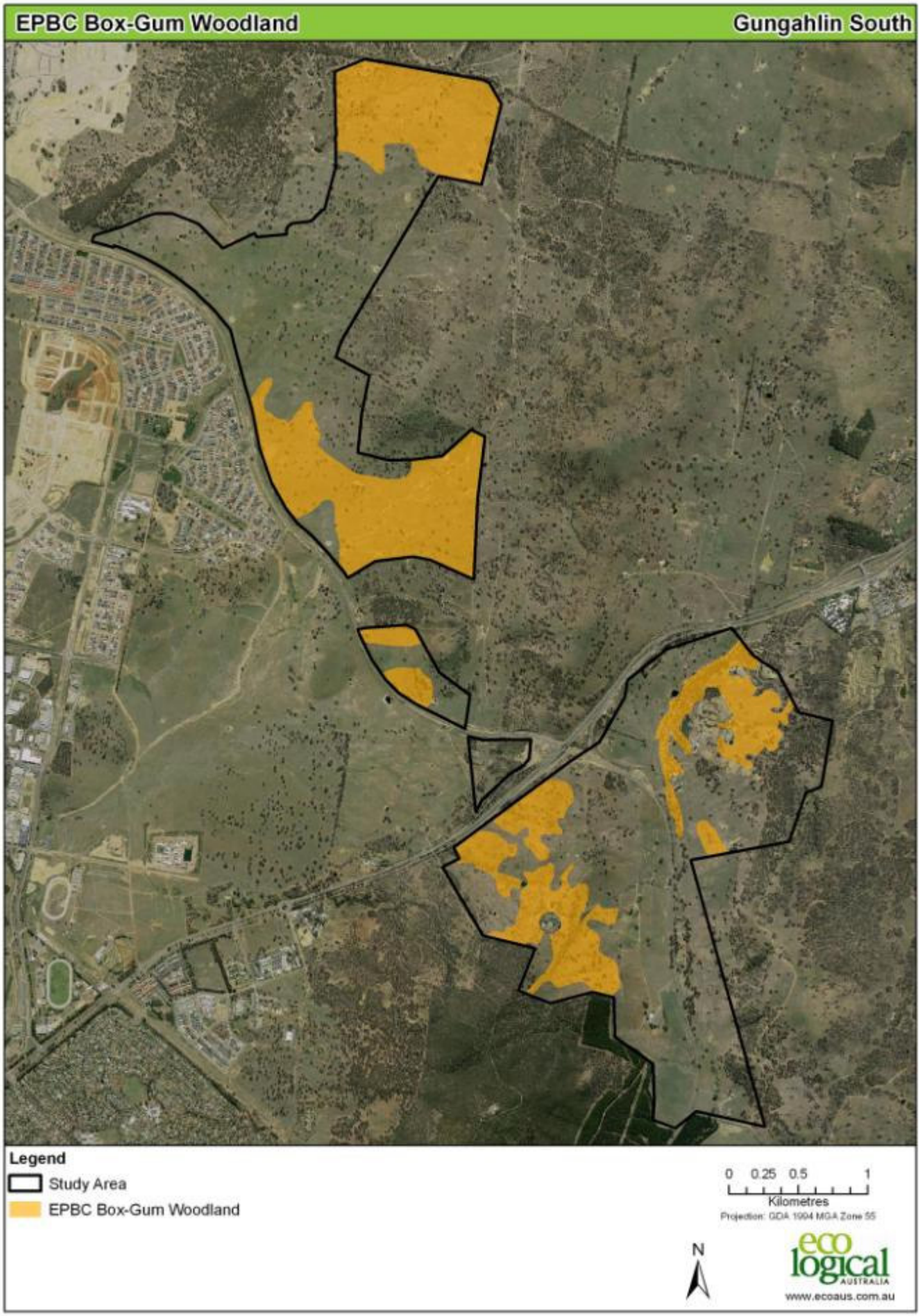

Figure 6: Box-Gum Woodland and threatened species for Throsby and Mt Majura to Goorooyaroo

4.1.2 Native Vegetation

A total of 1802 hectares of native vegetation meeting the *Nature Conservation Act 1980* criteria were recorded within the study area (Figure 7 and Figure 8).

The majority of the study area consisted of an understorey of native perennial vegetation with low occurrences of mixed exotic perennials and annuals (primarily thistle species). This was evident in both the woodland and derived grassland communities. Native vegetation across the study area was extensive and occurred in all areas except for occurrences of exotic vegetation and planted vegetation communities.

Planted vegetation communities have been removed from the definition of native vegetation (NC Act) because they represent highly modified communities. These communities are considerably different to other patches of native vegetation, despite containing local native overstorey species. The original source of the seed stock for the planted vegetation communities is unknown, and thus do not constitute native vegetation for this report.

The following vegetation communities represent native vegetation patches within the study area:

- Yellow Box – Blakely's Red Gum Tableland Grassy Woodland
- Yellow Box – Blakely's Red Gum Tableland Grassy Woodland Derived Native Grassland;
- Red Stringybark – Scribbly Gum Tableland Forest;
- Red Stringybark – Scribbly Gum Tableland Forest Derived Native Grassland;
- Broad-leaved Peppermint – Apple Box Tableland Woodland; and
- Dropping She-oak Tableland Woodland.

Exotic vegetation primarily represented disturbed grasslands used for grazing and agricultural purposes.

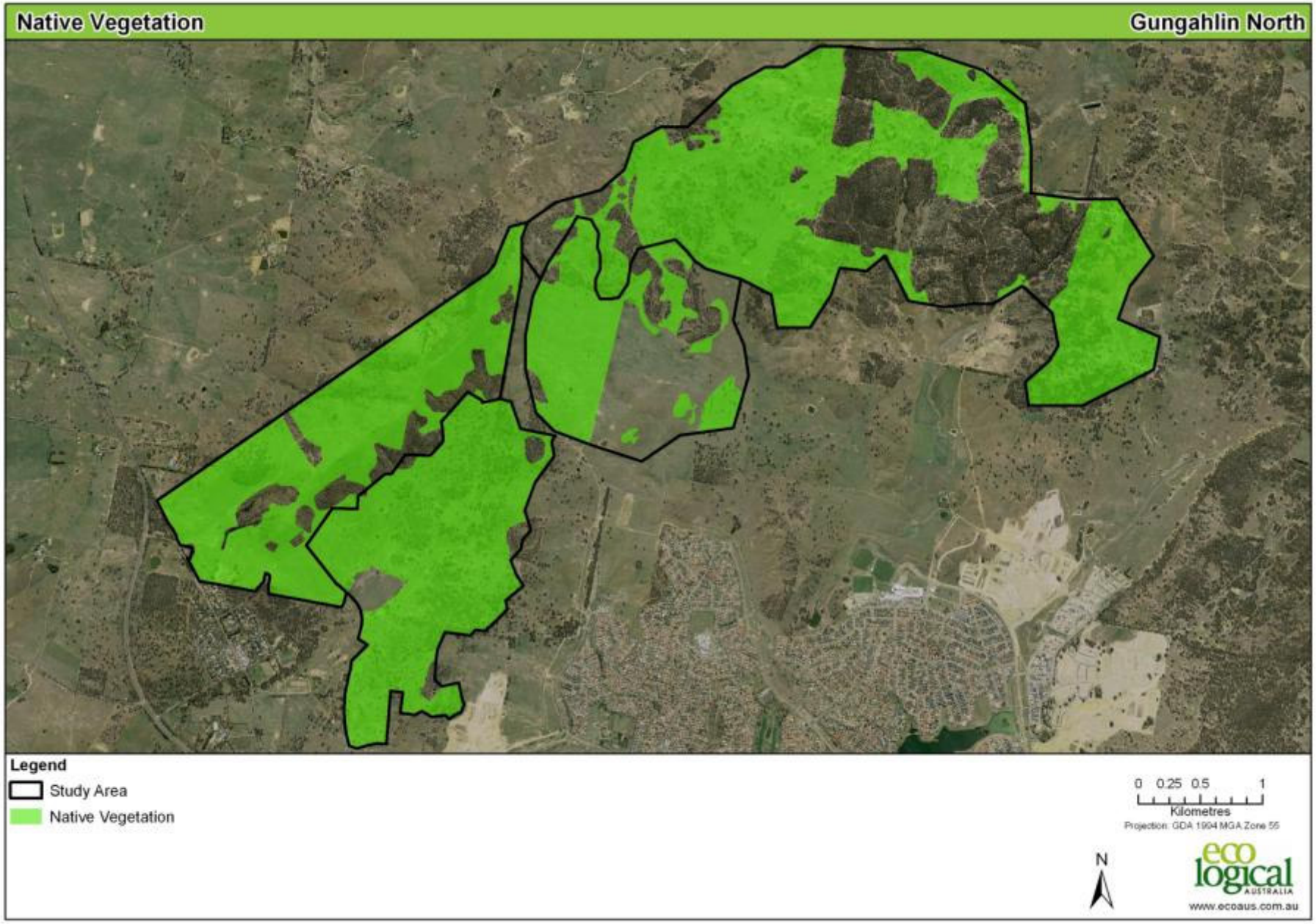

Figure 7: Native Vegetation for One Tree Hill, Kinlyside, Taylor and North Short Leases

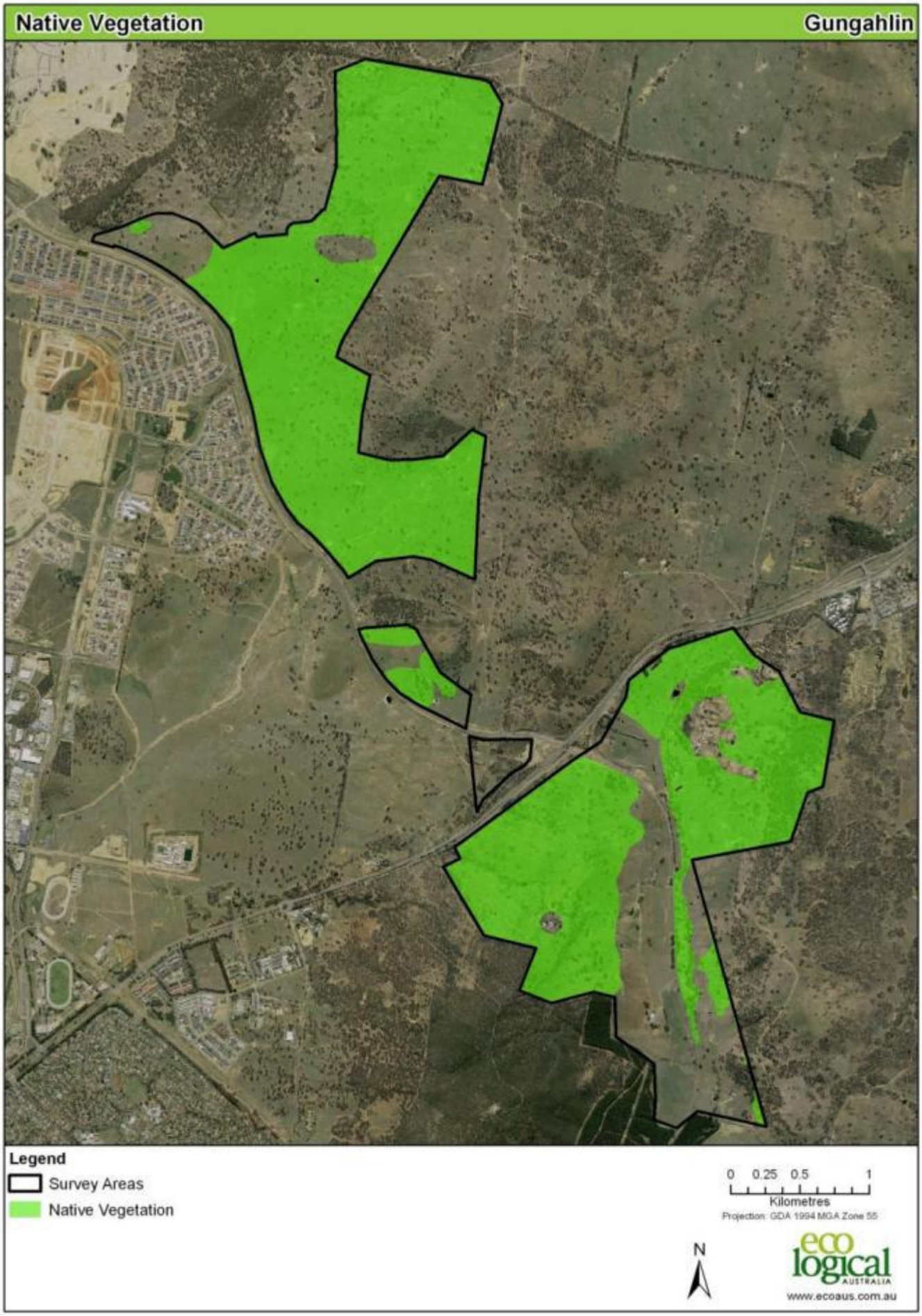

Figure 8: Native Vegetation for Throsby and Mt Majura to Goorooyaroo

4.1.3 Vegetation Classification

Vegetation communities recorded across the study area have been provided in Figure 9 and Figure 10. These vegetation communities currently present on ground may differ to their ACT climax vegetation community. Vegetation communities not listed as an ACT climax vegetation communities include planted and exotic vegetation. Exotic communities represent highly modified environments that have little resemblance to their original over-storey and understorey species. Planted vegetation consists of many native species, but the overstorey comprises many different endemic and non-endemic species.

There were four ACT climax vegetation communities common across the study area (Figure 11 and Figure 12).

- Yellow Box – Blakely's Red Gum Tableland Grassy Woodland;
- Broad-leaved Peppermint – Apple Box Tableland Woodland;
- Drooping She-oak Tableland Woodland: and
- Red Stringybark – Scribbly Gum Tableland Forest.

Yellow Box – Blakely's Red Gum Tableland Grassy Woodland

Yellow Box – Blakely's Red Gum Tableland Grassy Woodland occurs in the ACT on the middle and lower slopes of hills and in gently undulating topography that are less susceptible to cold air drainage. It occurs at an elevation of 600-900m in areas with loamy soils and moderate fertility and experiences approximately 400-800 mm of rain annually. The dominant over-storey species include *Eucalyptus melliodora* and *E. blakelyi* with *E. bridgesiana* and *E. mannifera* frequently occurring as sub-dominant species.

Within study area

Approximately 1350 ha of *Yellow Box – Blakely's Red Gum Tableland Grassy Woodland* occurs within the study area. This was the dominant Act climax vegetation community and is represented by both woodland and derived grassland Box-Gum Woodland structures shown in Figure 9 and Figure 10. Areas of planted and exotic vegetation described below were also originally this vegetation community.

The over-storey comprises Blakely's Red Gum and Yellow Box with a predominantly native understorey consisting primarily of *Austrostipa scabra, Austrodanthonia* spp*., Bothriochloa macra, Panicum effusum, Themeda australis* and *Microlaena stipoides*. Moderate to high diversity of native forbs and herbs were observed in the majority of patches and varied grazing regimes were evident. Patches of exotic species occur in moderate to high abundance in areas where grazing is relatively higher or a history of past agricultural management is evident. This vegetation community represents areas of moderate to high ecological values, particularly areas meeting the EPBC Act listing criteria for Box-Gum Woodland and where there is a high abundance of hollow-bearing trees. *Eucalyptus goniocalyx* was also observed in relatively low abundances in this vegetation community.

Red Stringybark – Scribbly Gum Tableland Forest

Red Stringybark – Scribbly Gum Tableland Forest occurs on exposed dry sites on the hills and foot slopes around Canberra, such as Black Mountain, as well as dry, steep, rocky sites. It occurs to an elevation up to 1000m and is often recorded on poorly developed of skeletal soils. Monocultures of *Eucalyptus mannifera* on shallow soils are also part of this community. The dominant overstorey species include *Eucalyptus macrorhyncha* and *E. rossii,* with *E. mannifera, E. dives,* and *E. polyanthemos* occurring frequently as sub-dominant species.

Within study area

Approximately 1115 ha of *Red Stringybark – Scribbly Gum Tableland Forest* occurs within the study area. This was the second most dominant Act climax vegetation community and was generally recorded upslope of *Yellow Box – Blakely's Red Gum Tableland Grassy Woodland*. It is represented by both the woodland and derived grassland structures of this vegetation community shown in Figure 9 and Figure 10. Areas of planted and exotic vegetation described below were also originally this vegetation community, particularly on the higher slopes.

The over-storey comprises Red Stringybark and Scribbly Gum with a predominantly native understorey. A moderate diversity of native forbs and herbs were observed in the majority of patches and varied grazing regimes were evident. This vegetation community represents areas of moderate to high ecological value, with patches of higher ecological value containing large areas of rocky habitat and high abundances of hollow-bearing trees. Relatively high abundances of *Eucalyptus goniocalyx* (Bundy) were also observed as part of this vegetation community in the North Leases, One Tree Hill and Kinlyside areas. *Eucalyptus goniocalyx* was observed as individual trees, as isolated patches of mature trees, or as a co-dominant overstorey species as part of this vegetation community. The relatively high abundance of *E. goniocalyx* in parts of the study area may be a result of historical clearing across grazing lands of other Eucalypt species.

Broad-leaved Peppermint – Apple Box Tableland Woodland

Broad-leaved Peppermint – Apple Box Tableland Woodland occurs primarily on warm dry lower slopes at an elevation of 900–1200 m. This vegetation community occurs on shallow sedimentary soils. The dominant over-storey species include *Eucalyptus dives* and *E. bridgesiana* with *E. nortonii* occurring as a sub-dominant species. *Bursaria spinosa* may constitute a significant mid-storey with *Elymus scaber* and *Themeda triandra* occurring in the understorey.

Within the study area

Approximately 14 ha of *Broad-leaved Peppermint – Apple Box Tableland Woodland* occurs within the study area. It occurs in two small patches in the south-eastern section near Mt Majura. The over-storey comprises primarily of Apple Box with a mixed native and exotic understorey. It was recorded adjacent to drainage lines and / or Majura Road and as a result, is linear in nature. It is a highly modified vegetation community and whilst it contains a predominantly native understorey, the diversity of native species is low.

Dropping She-oak Tableland Woodland

Drooping She-oak Tableland Woodland occurs on dry rocky hillsides at lower elevations and tends to occur on harsh sites such as gullies and on rocky scree slopes. The soils are generally shallow, and have a high abundance of rock throughout. It generally occurs in the ACT on north to northwest aspects, however, on Mt Majura it also occurs on eastern and southern aspects. The dominant overstorey species is *Allocasuarina verticillata* with a range of Eucalyptus species (*E. rossii, E. nortonii, E. polyanthemos, E. melliodora*) occurring sub-dominantly.

Within the study area

Approximately 0.60 ha of *Dropping She-oak Tableland Woodland* occurs within the study area. It occurs as one small patch in the south-west of the Mt Majura to Goorooyaroo section surrounded by *Yellow Box – Blakely's Red Gum Tableland Grassy Woodland*. This vegetation community, much like the

adjacent communities has a moderate to high native diversity of forbs and herbs and a low diversity and abundance of exotic species.

Other Vegetation Communities

Planted Vegetation

Stands of planted Eucalypt forest were observed within the northern and western sections of the study area. These forests range from approximately 25 to 40 years and contain an over-storey of local Eucalyptus species including, *Eucalyptus mannifera, E. blakelyi, E. macrorhyncha* and *E. viminalis* with a native understorey. Whilst this community contains remnant ground cover, they are considered highly modified environments as tree densities and pre-plant ripping have affected surface hydrology, available sunlight and soil moisture. The selection of many tree species, although known to grow in the region, were planted in areas inconsistent with soil types typically associated with these species. They are highly unlikely to reach a climax community similar to any of the described communities and hence were not included within the native vegetation classification (NC Act) for this report.

Exotic Vegetation

Exotic vegetation represents areas of highly modified vegetation such as exotic pasture and is generally indicative of areas of low ecological value. These patches show signs of frequent, moderate grazing. Common pasture grasses include *Phalaris aquatic* and *Paspalum dilatatum*. Other common exotic species include *Acetosella vulgaris, Trifolium* spp.*, Hypochaeris radicata, Petrorhagia nanteuilii, Setaria* sp.*, Conyza* sp. and *Centaurium* sp.

Table 2: Vegetation communities within the study area

ACT Climax Vegetation Communities	***Hectares***
Yellow Box - Blakely's Red Gum Tableland Grassy Woodland	1350
Red Stringybark - Scribbly Gum Tableland Forest	1115
Broad-leaved Peppermint - Apple Box Tableland Woodland	14
Drooping She-oak Tableland Woodland	0.60
Other areas (not visited)	13
Total	**2492**
Vegetation Communities (current)	
Yellow Box - Blakely's Red Gum Tableland Grassy Woodland	366
Yellow Box – Blakely's Red Gum Tableland Grassy Woodland Derived Grasslands	668
Red Stringybark - Scribbly Gum Tableland Forest	362
Red Stringybark - Scribbly Gum Tableland Forest Derived Grasslands	391
Broad-leaved Peppermint - Apple Box Tableland Woodland	14
Drooping She-oak Tableland Woodland	0.60
Planted	362
Exotic	256
Other areas (cleared and not visited)	73
Total	**2492**

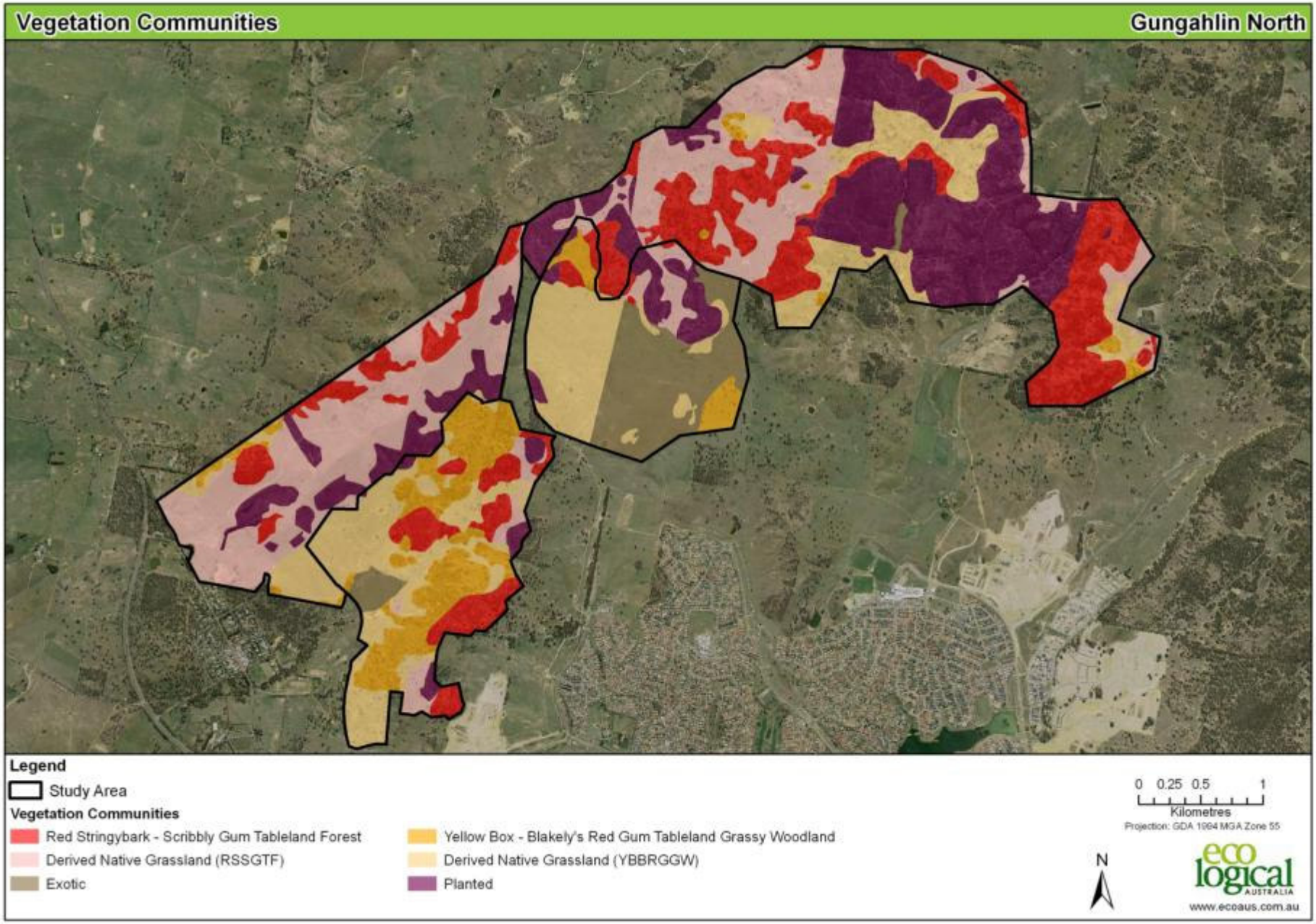

Figure 9: Vegetation communities for One Tree Hill, Kinlyside, Taylor and North Short Leases

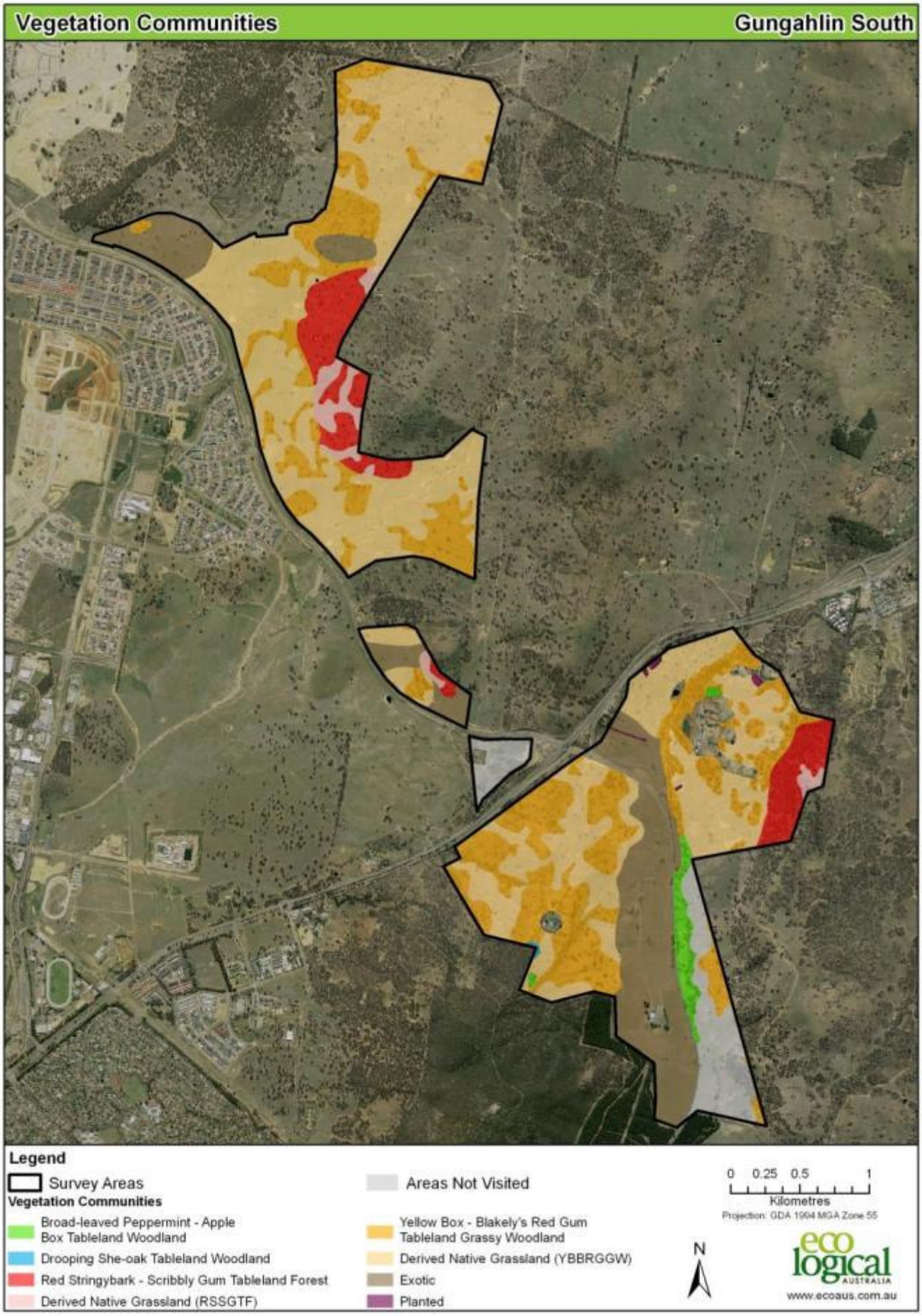

Figure 10: Vegetation communities for Throsby and Mt Majura to Goorooyaroo

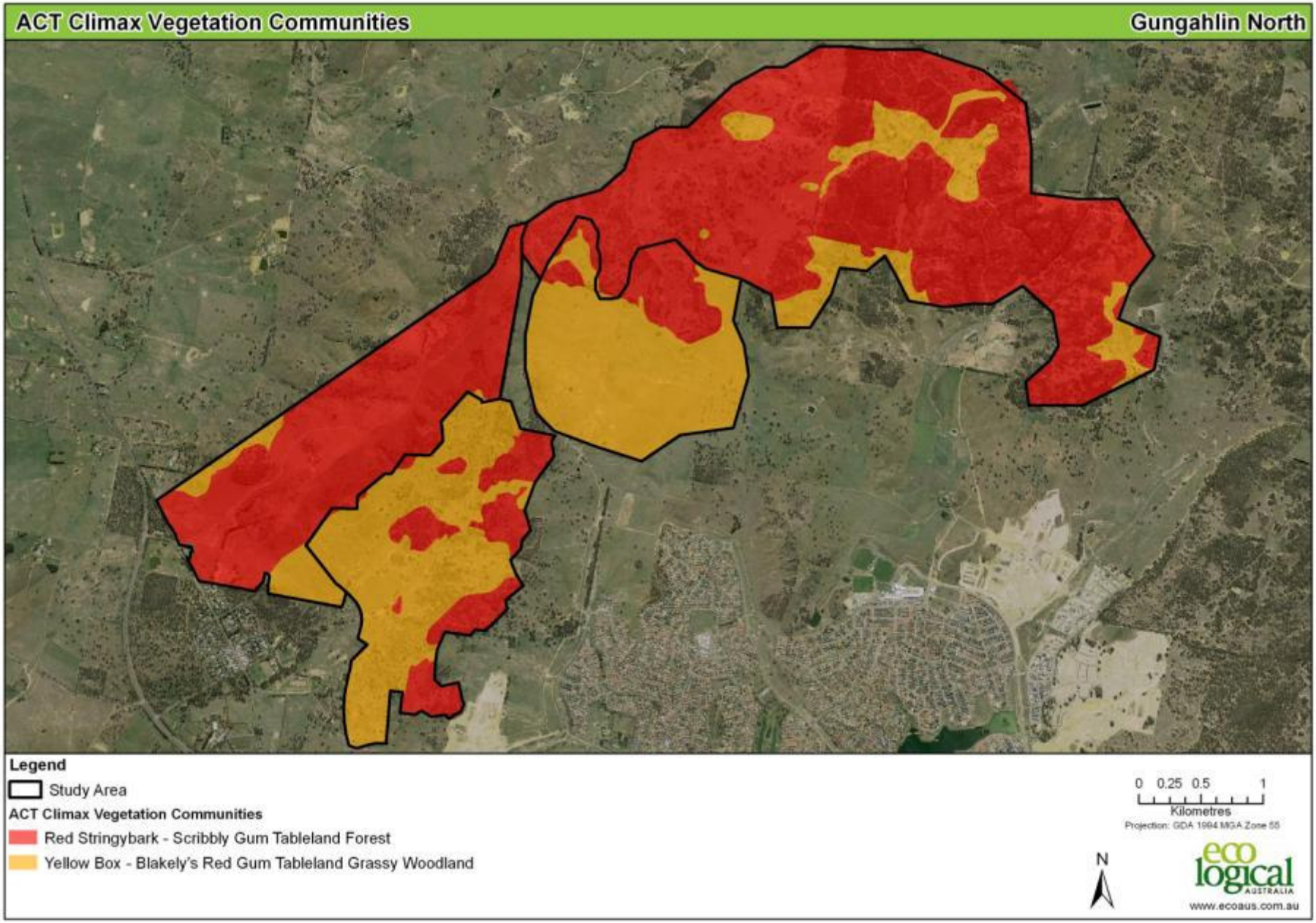

Figure 11: ACT climax vegetation communities for One Tree Hill, Kinlyside, Taylor and North Short Leases

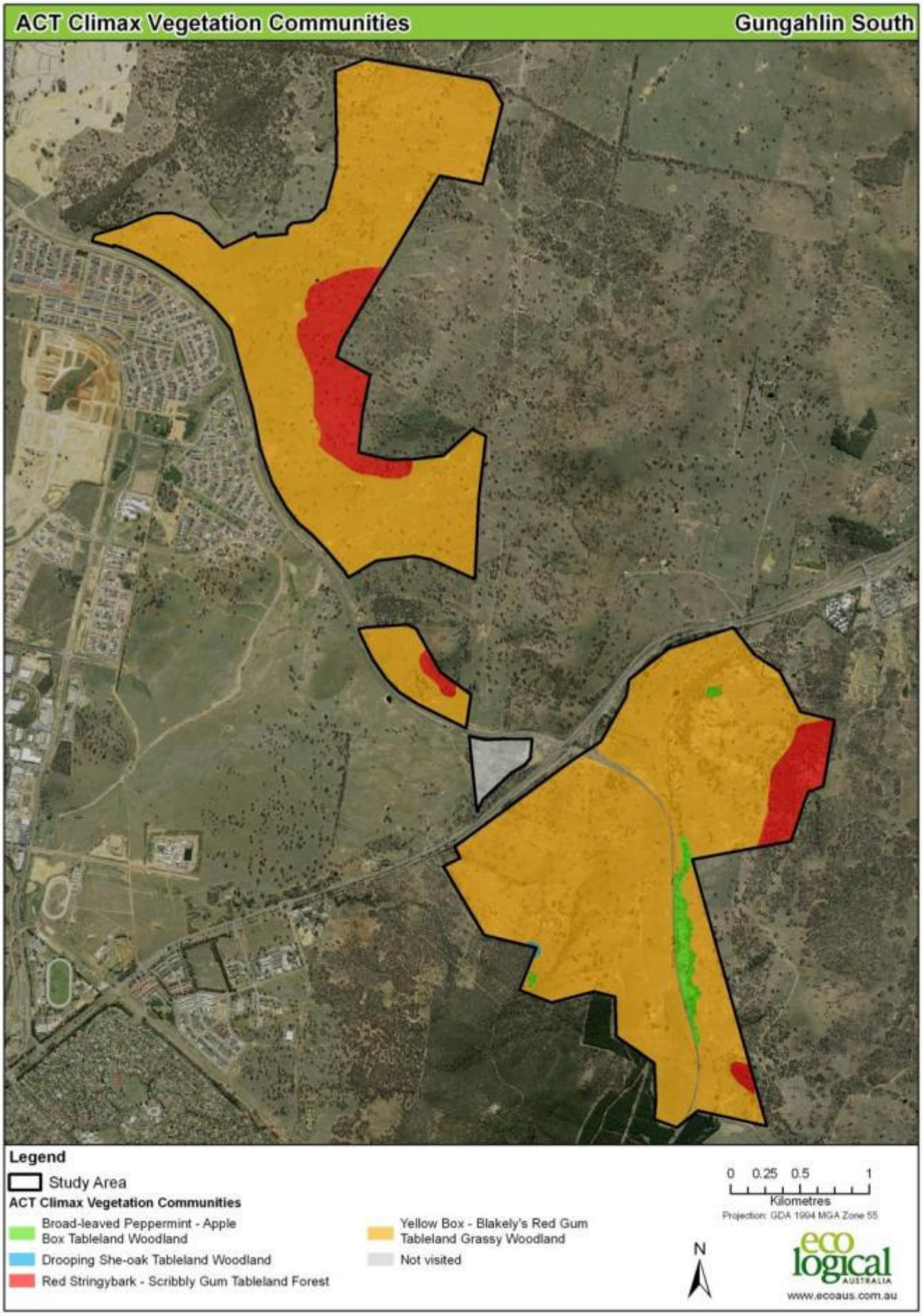

Figure 12: ACT climax vegetation communities for Throsby and Mt Majura to Goorooyaroo

4.1.4 Threatened Flora Species

Leucochrysum albicans var. *Tricolor* (Hoary Sunray) is a perennial herb up to 45cm in height and is listed as endangered under the EPBC Act. The Hoary Sunray was once widespread but now occurs primarily on agricultural land roadside easements, cemeteries and railway verges.

Hoary Sunray was recorded at two locations on adjacent leases in blocks 578 and 670 in the south east of the study area (Figure 6 and Table 1). Approximately 1000+ individuals were observed scattered in Block 578 within very high quality Box-Gum Woodland. Approximately 10 individuals in two small patches were observed in Box-Gum Woodland within Block 670. This block has low grazing intensity.

Four other flora species listed as rare or threatened plants in the ACT were also observed within the study area (Table 1). These species include *Burchardia umbellata, Hydrocotyle pedunculata, Orchidaceae* sp.*,* and *Styphelia triflora* and were identified as individual plants. No other threatened or rare flora species were recorded during the vegetation assessments.

Table 1: Rare or threatened plants listed in the ACT observed during the field surveys.

Species Name	Common Name	ACT Block (Site)	Grid Reference (GDA 94 MGA Zone 55)
Burchardia umbellata	Milkmaid	808 (Kinlyside)	689721, 6107426
Leucochrysum albicans var. Tricolor	Hoary Sunray	Blocks 578 & 670 (Majura)	698473, 6100205 698869, 6099764 698982, 6099575
Hydrocotyle pedunculata	Pennywort	734 (Throsby)	697597, 6105718
Orchidaceae sp.	Orchid	808 (One Tree Hill) & 11 (North Short Lease)	688909, 6107820 695027, 6108222
Styphelia triflora	Pink Five-Corners	559 (Majura)	700885, 6101063

4.1.5 Threatened and Declining Birds

An opportunistic sighting of a *Petroica phoenicea* (Flame Robin) which is listed under the EPBC Act (Marine status) and *Chthonicola sagittatus* (Speckled Warbler) which is listed under NSW legislation was recorded within Kinlyside (Figure 5 and Table 2). These species are not listed in the ACT or outside of a Commonwealth marine area, and thus have no legislative requirements within the study area.

Table 2: Threatened and declining bird species observed during the field surveys.

Species Name	Common Name	ACT Block (Site)	Grid Reference (GDA 94 MGA Zone 55)
Petroica phoenicea	Flame Robin	780 (Kinlyside)	689909, 6106405
Chthonicola sagittatus	Speckled Warbler	780 (Kinlyside)	689909, 6106405

The distribution of rare and threatened species observed across the study area during the field surveys have been illustrated in Figure 13 and Figure 14.

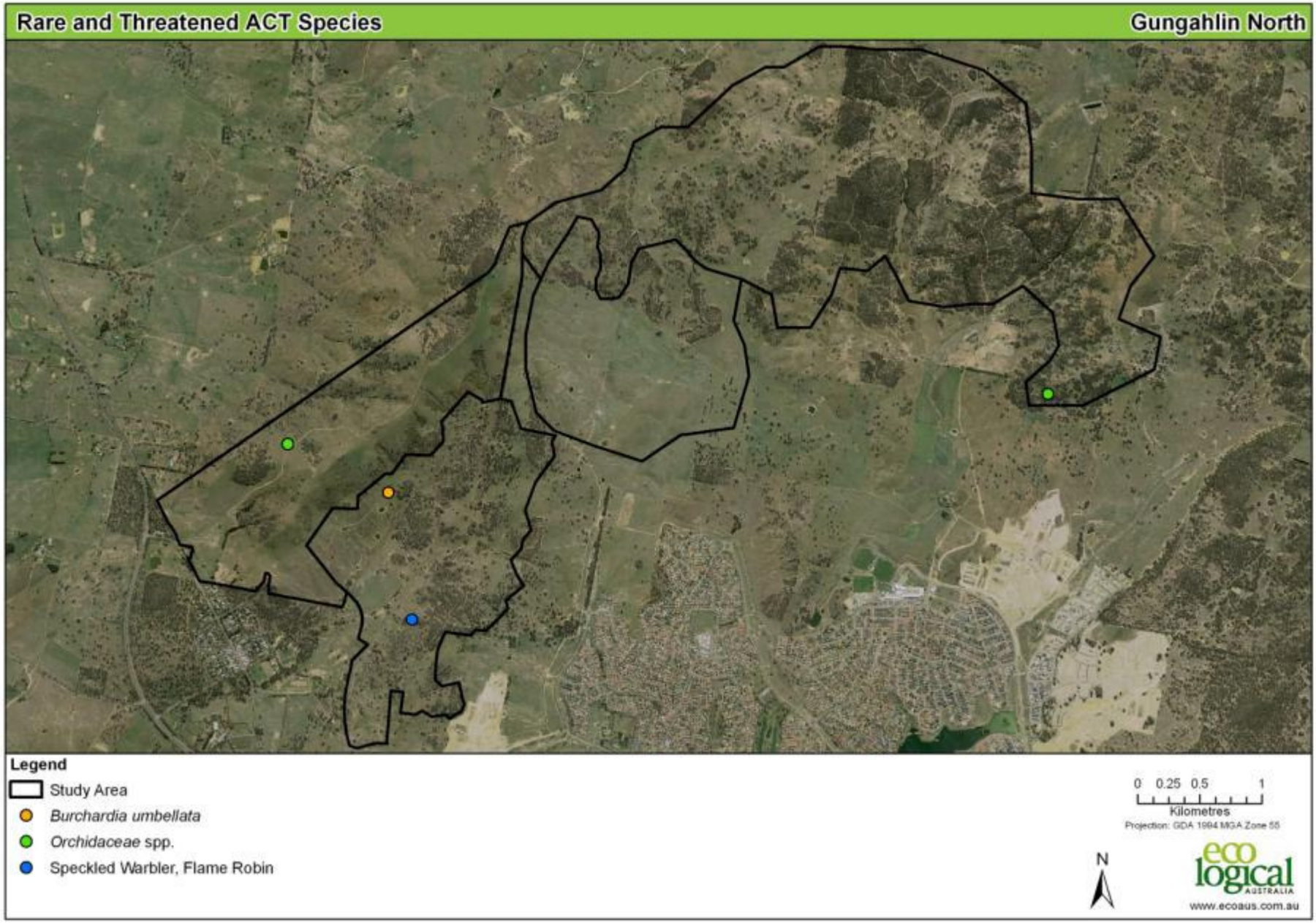

Figure 13: Threatened and rare ACT species for One Tree Hill, Kinlyside, Taylor and North Short Leases

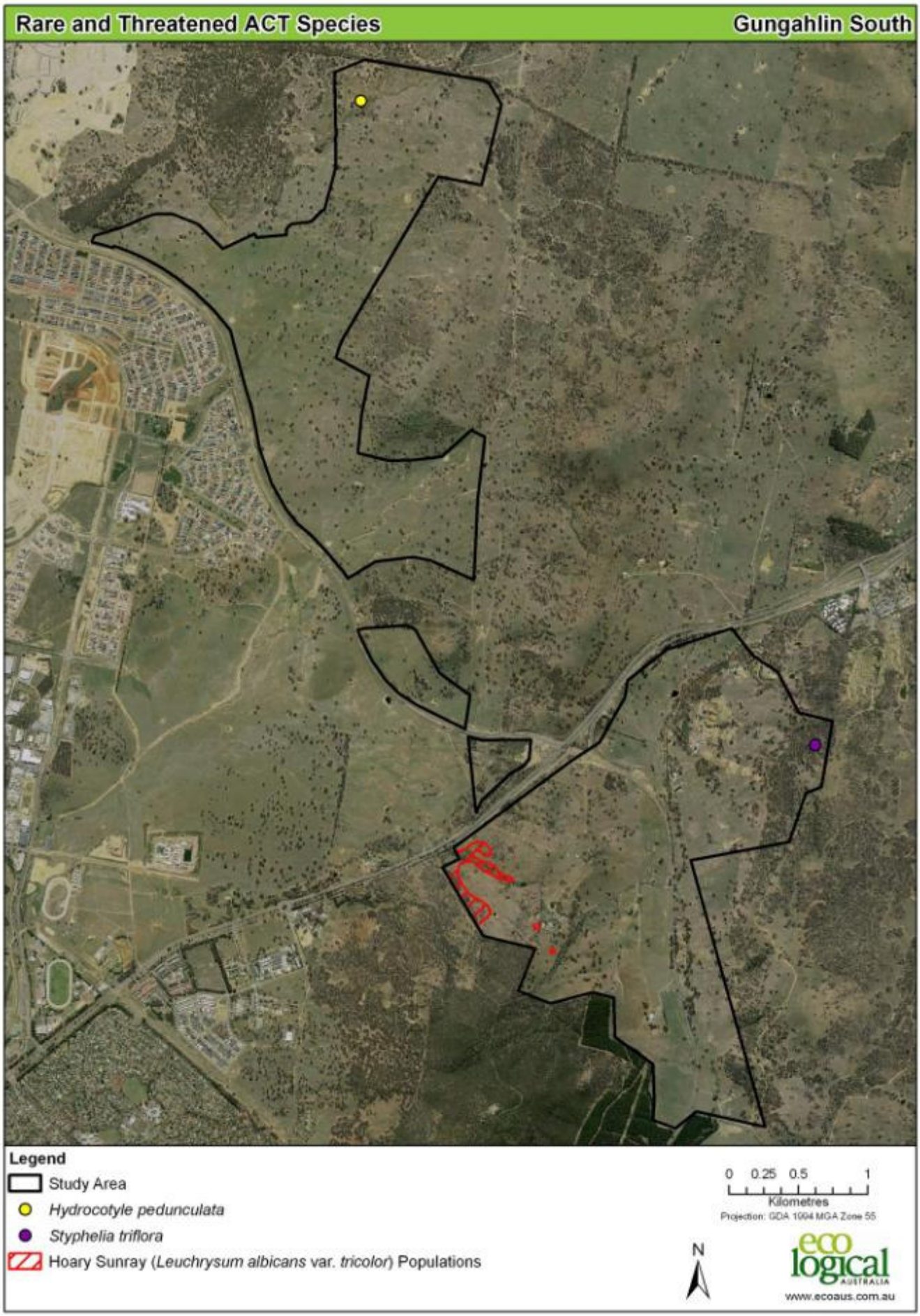

Figure 14: Threatened and rare ACT species for Throsby and Mt Majura to Goorooyaroo

4.2 HABITAT RESOURCES

Available habitat resources were recorded during the vegetation assessments and have been mapped according to their relative abundance below.

Golden Sun Moth habitat was not directly assessed or mapped, but was observed on site in areas dominated by native grasses such as *Austrodanthonia* spp. (Wallaby Grass), *Austrostipa* spp. (Spear Grass) and *Themeda australis* (Kangaroo Grass). Potential habitat occurred across woodland and derived native grassland varieties of Box-Gum Woodland within Throsby, One Tree Hill and Kinlyside.

4.2.1 Hollow-bearing Trees

Tree density across the site was relatively low due to the open woodland nature of Box-Gum Woodland communities on site and past clearing for agricultural practises. Where trees were present, they were often scattered or in fragmented clumps, particularly around Kinlyside, the north east of study area and within Eucalypt plantations. The numbers of trees in some patches meant that an estimate of the relative abundance of tree hollows within the patch was the most efficient appraisal of this resource. Eucalypt plantations were relatively young (< 50 years) and did not support any hollows. The relative abundance of hollow-bearing trees across the study area is illustrated in Figure 15 and Figure 16.

4.2.2 Rocky Habitat

The presence and abundance of rocky habitat varied considerable across the site (Figure 17 and Figure 18). In general, there was a relative low abundance of rocky habitat. The presence of rocky habitat often correlated to slopes, tops of ridges and other changes in elevation across the study area. Rocky habitat was occurred in high abundance in the north east of the study area in the hill slopes of the Sporting Shooters Club (Block 669) and on the hill tops of Block 578 with moderate abundances observed at Kinlyside and One Tree Hill.

Pink-tailed Worm Lizard (*Aprasia parapulchella*) habitat was not directly assessed during the field surveys but was observed on site. Pink-tailed Worm Lizards favour open grassland habitats that have a substantial cover of small rocks. This type of habitat is present in patches of high and moderate rocky habitat abundance particularly in One Tree Hill, Kinlyside and Block 578 east of the Federal Hwy.

Habitat descriptions used to classify sites as potential habitat for Pink-tailed Worm Lizards is provided below and based on Osborne and Coghlan (2004) and Osborne and Wong (2007). However, this was not assessed during these surveys

- High quality potential habitat: Areas of suitable surface rock with a high cover of *Themeda australis* and relatively little evidence of disturbance (e.g. weed invasion). Sites typically have greater than 50 % native ground cover and other native species likely to be present include *Bothriochloa macra, Austrostipa* spp., *Lomandra filiformis,* and *Austrodanthonia* spp.
- Moderate quality potential habitat: Areas of suitable surface rock dominated by *Themeda australis* with evidence of higher levels of disturbance or history of disturbance (e.g. weed invasion or high grazing) and areas of lower floristic diversity often dominated by *Austrostipa* spp. and *Austrodanthonia* spp.. Sites often have with less than 50% cover of native grasses. Exotic species likely to be present include *Aira* sp., *Vulpia bromoides,* and *Avena fatua*.
- Low quality potential habitat: Areas of suitable rock that is highly disturbed (e.g. exhibiting high levels of weed invasion or evidence of high levels of previous disturbance such as forestry activities). Sites are dominated almost entirely by exotic species. May include the native tussock forming species *Austrostipa bigeniculata* and *Poa labillardieri*. Rosette forming herbs such as *Hypochaeris radicata* are usually present.

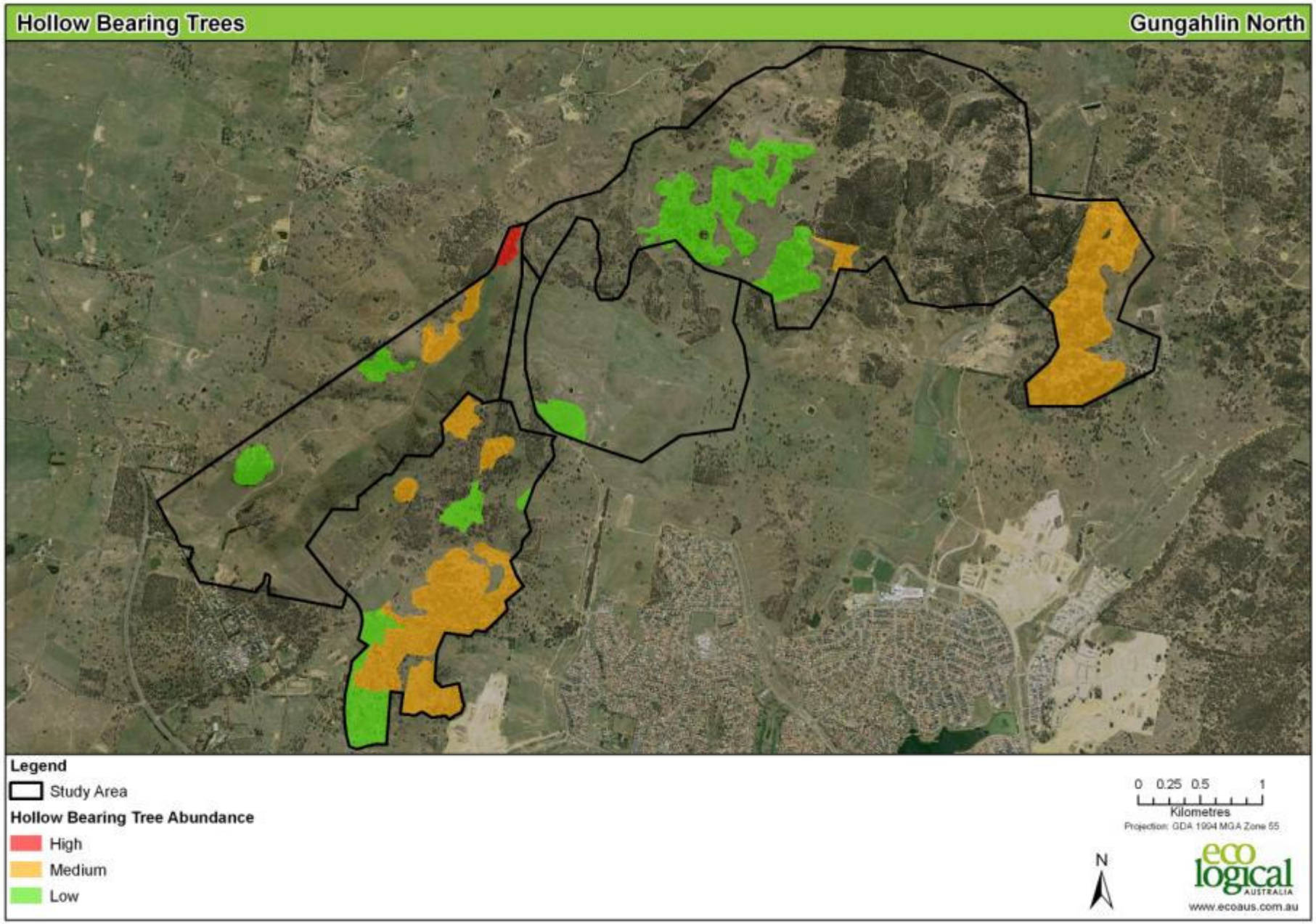

Figure 15: Relative hollow-bearing tree abundance observed across One Tree Hill, Kinlyside, Taylor and North Short Leases

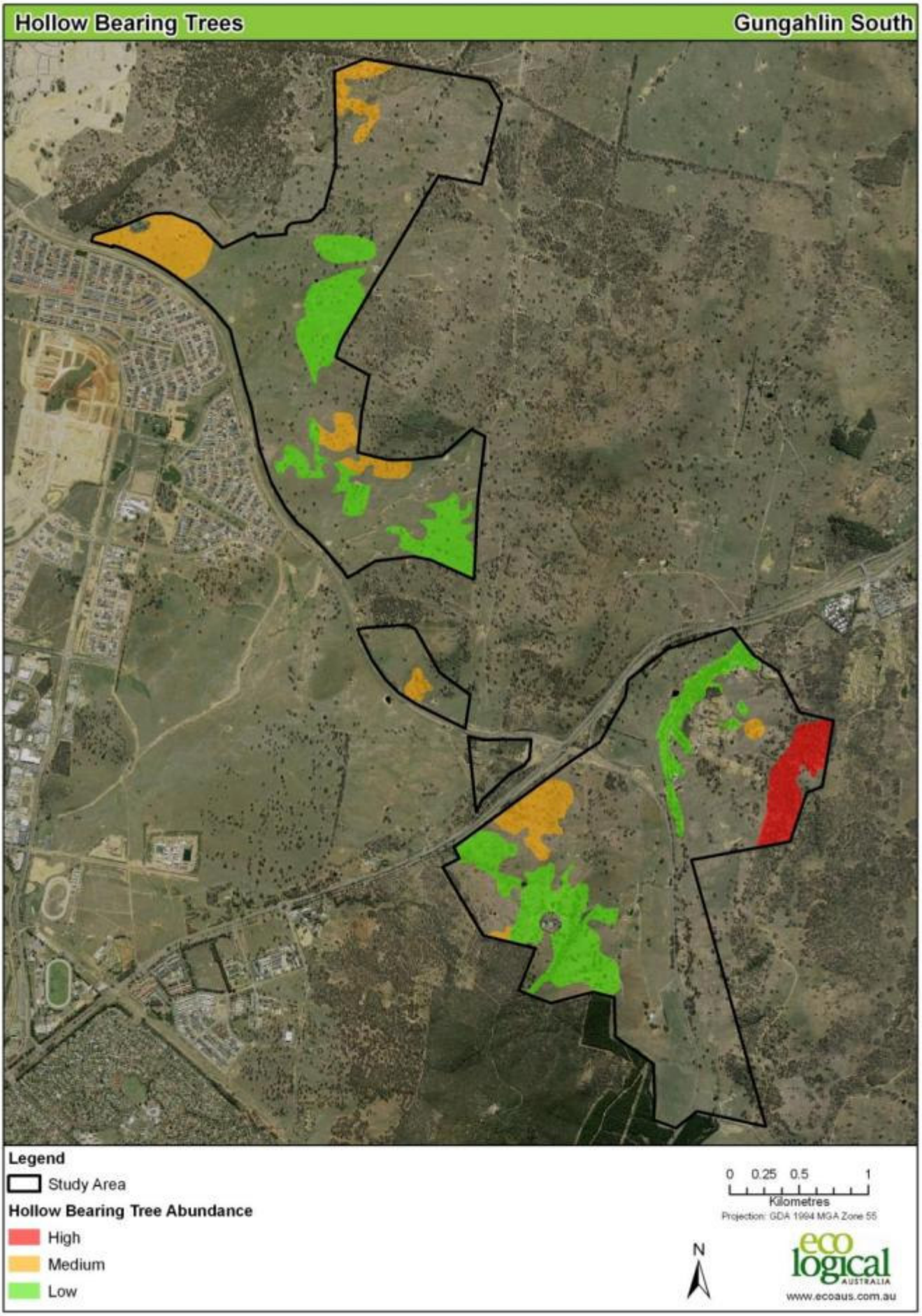

Figure 16: Relative hollow-bearing tree abundance observed across Throsby and Mt Majura to Goorooyaroo

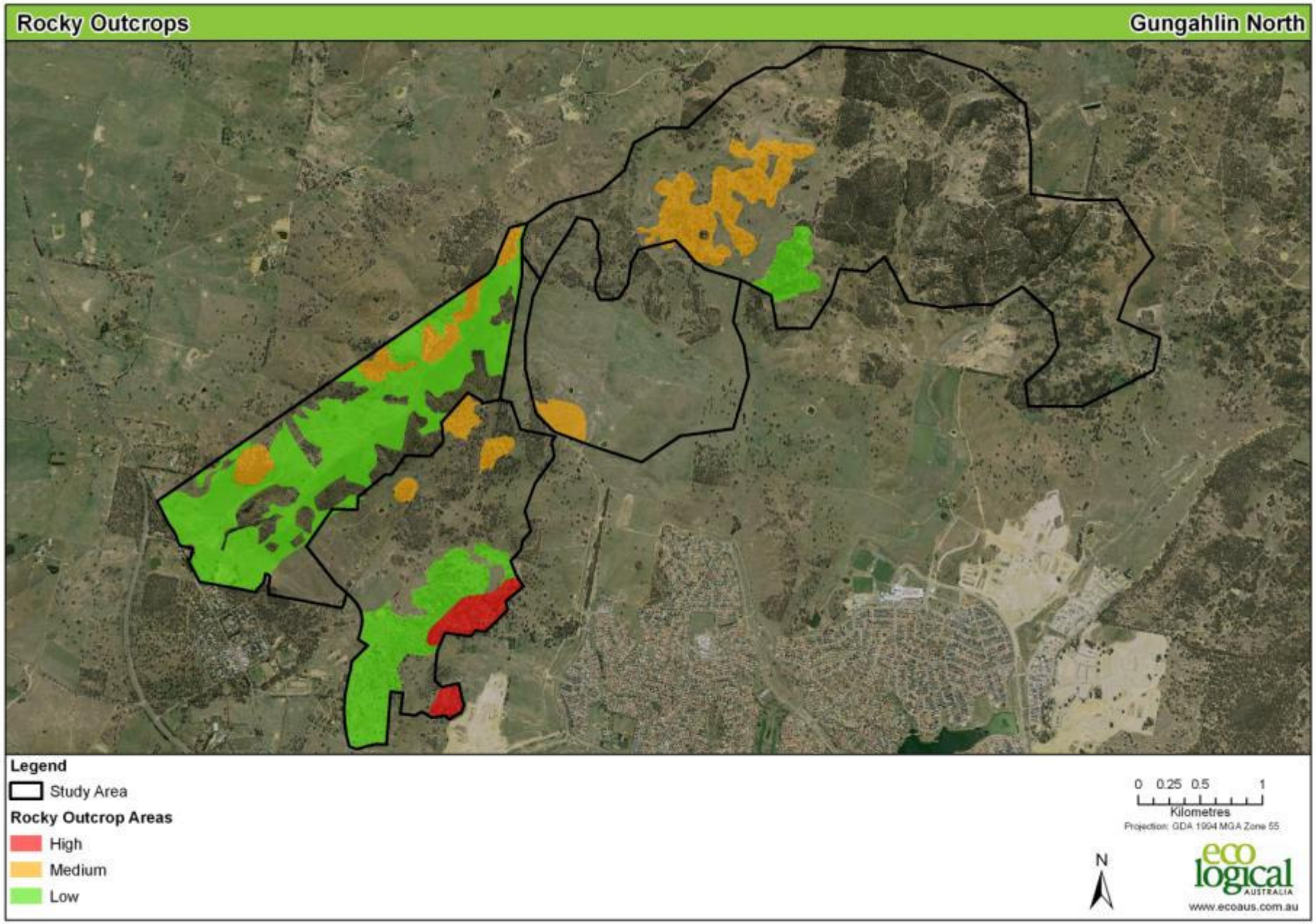

Figure 17: Rocky habitat observed across One Tree Hill, Kinlyside, Taylor and North Short Leases

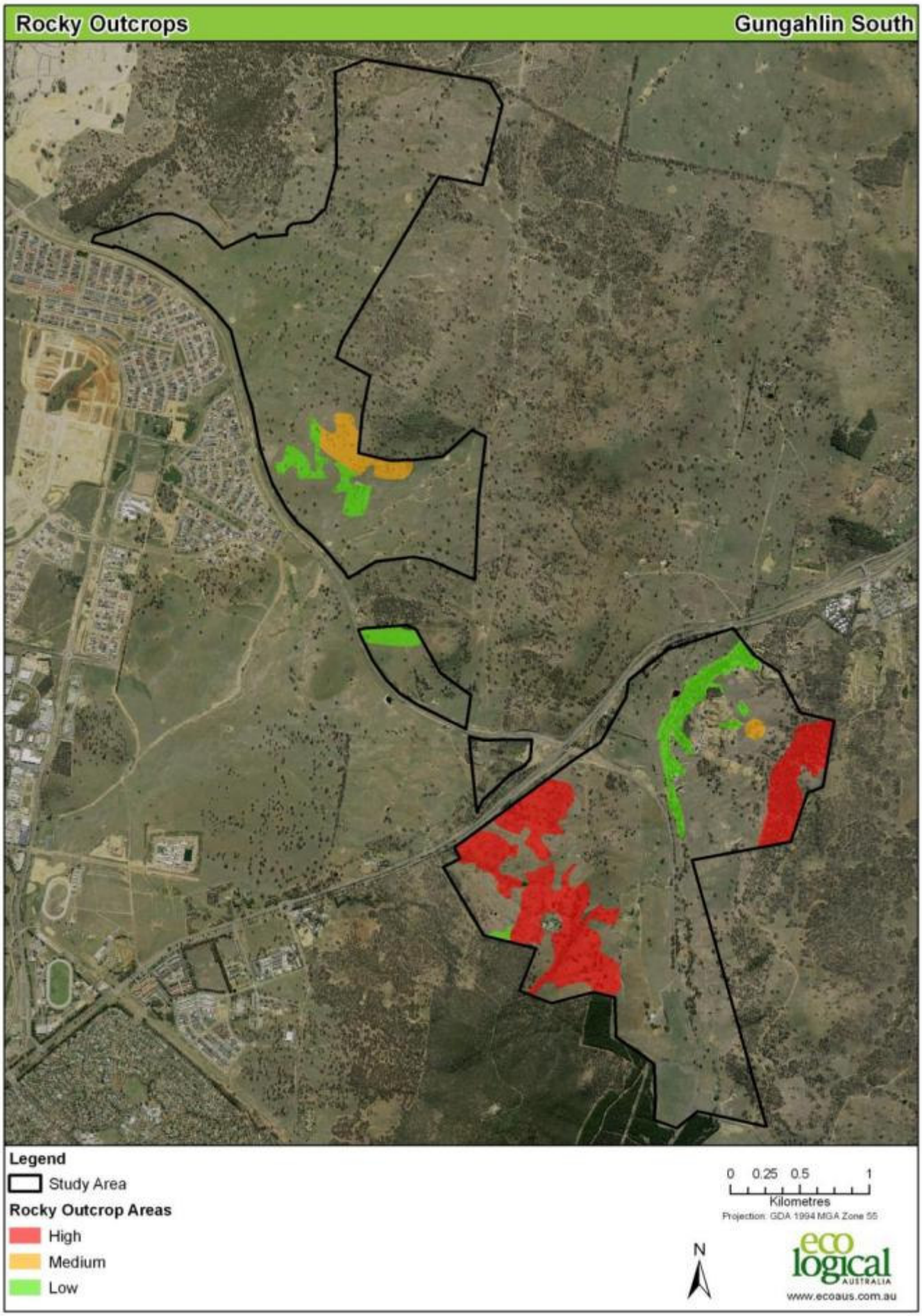

Figure 18: Rocky-habitat observed across Throsby and Mt Majura to Goorooyaroo

Summary

The study area covered approximately 2,492 ha from between Mt Majura and Goorooyaroo, Kinlyside, One-tree Hill, Taylor, Throsby and a range of short-term leases north of Gungahlin. It consists primarily of agricultural land used for grazing on native and exotic pasture. As a result, much of the land within the study area has previously been cleared for grazing. A number of Eucalypt forest plantations exist in the northern section of the study area.

Box-Gum Woodlands

A total of 525.5 ha of Box-Gum Woodland (*White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland*) in varying condition was identified within the study area. Box-Gum Woodland varied greatly across the study area in that some patches contained a canopy and/or a regenerating canopy, while others do not and occur as Derived Native Grassland (Secondary Grassland). For many patches of Box-Gum Woodland and Derived Native Grassland, the majority of the patch comprised native perennial grasses with a low abundance of exotic annual grasses. Wooded examples were of an open structure across agricultural land, with limited woody debris on the ground, a low to moderate cover of grasses and forbs, and zero to few shrubs. However, some areas exhibited high native diversity, whilst others had larger infestations of exotic weed species.

Native Vegetation

The study area contained a total of 1802 hectares of native vegetation meeting the *Nature Conservation Act 1980* criteria. Native vegetation across the study area was extensive and occurred in all areas except for occurrences of exotic vegetation and planted vegetation communities. Planted vegetation communities have been removed from the definition of native vegetation (NC Act) because they represent highly modified communities. These communities are considerably different to other patches of native vegetation, despite containing local native overstorey species.

The following vegetation communities represent native vegetation patches within the study area:

- Yellow Box – Blakely's Red Gum Tableland Grassy Woodland
- Yellow Box – Blakely's Red Gum Tableland Grassy Woodland Derived Native Grassland;
- Red Stringybark – Scribbly Gum Tableland Forest;
- Red Stringybark – Scribbly Gum Tableland Forest Derived Native Grassland;
- Broad-leaved Peppermint – Apple Box Tableland Woodland; and
- Dropping She-oak Tableland Woodland.

ACT Climax Vegetation

A total of four ACT climax vegetation communities were recorded across the study area including:

- Yellow Box – Blakely's Red Gum Tableland Grassy Woodland;
- Red Stringybark – Scribbly Gum Tableland Forest;
- Broad-leaved Peppermint – Apple Box Tableland Woodland; and

- Dropping She-oak Tableland Woodland.

Other vegetation communities currently present on ground differed slightly to their ACT climax vegetation community. Vegetation communities not listed as an ACT climax vegetation communities include planted and exotic vegetation. Exotic communities represent highly modified environments that have little resemblance to their original over-storey and understorey species. Planted vegetation consists of many native species, but the overstorey comprises many different endemic and non-endemic species.

Threatened Species

The Hoary Sunray (*Leucochrysum albicans* var. *tricolor*) was recorded at two locations within adjacent leases in block 578 and block 670 in the south east of the study area around Mt Majura and Goorooyaroo.

Four other flora species listed as Rare or Threatened plants in the ACT were also observed within the study area (Table 1). These species include *Burchardia umbellata, Hydrocotyle pedunculata, Orchidaceae* sp.*,* and *Styphelia triflora* and were identified as individual plants. No other threatened or rare flora species were recorded during the vegetation assessments.

A Flame Robin listed under the EPBC Act and Speckled Warbler listed under NSW legislation was opportunistically observed during the field survey and mapped within Kinlyside.

Habitat Resources

Habitat resources and features were recorded during the vegetation assessments. The relative abundance of each habitat feature has been illustrated in Figures 15-18. It is likely that habitat exists for rare or threatened fauna species such as the Golden Sun Moth (*Synemon plana*) and the Pink-tailed Worm Lizard (*Aprasia parapulchella*) amongst others, but these specific habitats were not directly assessed during the field surveys.

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Threatened Species Scientific Committee (2006) *Advice to the Minister: White Box - Yellow Box - Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands*.

Appendix A: Flora Species List and Grid References

Appendix A presented below provides:

- Appendix A-1: The species list for the entire study area.
- Appendix A-2: Grid references and vegetation information for each transect.
- Appendix A-3: The species list for each of the vegetation transects.

Flora species presented in the overall species list that are highlighted as bold are listed as rare or threatened plants in the ACT.

The key for interpreting the data cover abundance for the species list per transect is provided in the table below:

Key (cover abundance score)
5 = > 75%
4 = 50-75%
3 = 25-50%
2 = 5-25%
1 = numerous/scattered < 5%
p = few < 5%
r = solitary < 5%
pat = patchy distribution
* = present

APPENDIX A-1: THE SPECIES LIST FOR THE ENTIRE STUDY AREA

STUDY AREA SPECIES LIST		
Exotic		
Acetosella vulgaris	*Erodium* sp.	*Portulaca oleracea*
Aira cupaniana	*Gamochaeta americium*	*Rosa rubiginosa*
Aira sp.	*Hirschfeldia incana*	*Rubus fruticosus*
Anagallis arvensis	*Holcus lanatus*	*Rumex crispus*
Anthoxanthum odoratum	*Hordeum* sp.	*Salvia verbenaca*
Arctotheca calendula	*Hypericum perforatum*	*Setaria parviflora*
Avena sp.	*Hypericum sp.*	*Setaria* sp.
Briza maxima	*Hypochaeris glabra*	*Senecio* sp.
Briza minor	*Hypochaeris radicata*	*Silybum marianum*
Bromus. diandrus	*Hypochaeris* sp.	*Silene gallica*
Bromus hordeaceus	*Juncus acutus*	*Solanum* sp.
Bromus sp.	*Juncus sp.*	*Solanum nigricans*
Carthamus lanatus	*Lactuca serriola*	*Sonchus* sp.
Centaurium sp.	*Lepidium africanum*	*Sorghum* sp.
Chondrilla juncea	*Linum trigynum*	*Taraxacum officinale*
Citrullus sp.	*Lolium perenne*	*Tolpis barbata*
Cirsium vulgare	*Lolium rigidum*	*Tolpis umbellata*
Conyza sp.	*Malva parviflora*	*Tragopogon dubius*
Crataegus sp.	*Marrubium vulgare*	*Trifolium angustifolium*
Cynodon dactylon	*Medicago* sp.	*Trifolium arvense*
Cynosurus echinatus	*Modiola caroliniana*	*Trifolium repens*
Cyperus eragrostis	*Nassella neesiana*	*Trifolium* sp.
Dactylis glomerata	*Nassella trichotoma*	*Verbascum thapsus*
Dittrichia graveolens	*Onopordum acanthium*	*Verbascum virgatum*
Dittrichia sp.	*Orobanche minor*	*Vulpia* sp.
Echium plantagineum	*Paronychia brasiliana*	
Eleusine tristachya	*Paspalum dilatatum*	
Eleusine sp.	*Petrorhagia nanteuilii*	
Eragrostis cilianensis	*Phalaris aquatica*	
Eragrostis sp.	*Pinus radiata*	
Erodium botrys	*Plantago lanceolata*	
Erodium cicutarium	*Polygonum aviculare*	
NATIVE SPECIES		
Acacia baileyana	*Austrostipa densiflora*	*Cymbonotus lawsonianus*
Acacia buxifolia	*Austrostipa mollis*	*Cymbonotus* sp.
Acacia dealbata	*Austrostipa scabra*	*Cymbopogon refractus*
Acacia decurrens	*Astroloma humifusum*	*Cynoglossum suaveolens*
Acacia gunnii	*Astrotricha ledifolia*	*Cynoglossum* sp.
Acacia implexa	*Billardiera* sp.	*Daviesia genistifolia*
Acacia mearnsii	*Blechnum* sp.	*Daucus glochidiatus*
Acacia pycnantha	*Bossiaea buxifolia*	*Desmodium varians*
Acacia parramattensis	*Bothriochloa macra*	*Dianella longifolia*
Acacia pravissima	*Brachyloma daphnoides*	*Dianella revoluta*
Acacia rubida	*Bracteantha viscosa*	*Dichelachne micrantha*
Acacia ulicifolia	***Burchardia umbellata***	*Dichelachne rara*
Acaena echinata	*Bursaria spinosa sp. Lasiophylla*	*Dichelachne* sp.
Acaena ovina	*Calocephalus citreus*	*Dichondra repens*
Acaena novae-zelandiae	*Carex appressa*	*Dichopogon fimbriatus*
Acaena sp.	*Carex breviculmis*	*Dillwynia sericea*
Agrostis avenacea	*Carex inversa*	*Dodonaea viscosa*

STUDY AREA SPECIES LIST		
Allocasuarina verticillata	*Carex* sp.	*Einadia nutans*
Alternanthera denticulata	*Cassinia aculeata*	*Eleocharis acuta*
Alternanthera nana	*Cassinia longifolia*	*Elymus scaber*
Alternanthera sp.	*Cassinia quinquefaria*	*Enneapogon nigricans*
Amyema sp.	*Centipeda cunninghamii*	*Epilobium billardiereanum*
Aristida ramosa	*Chamaesyce drummondii*	*Eragrostis brownii*
Arthropodium sp.	*Cheilanthes austrotenuifolia*	*Eragrostis trachycarpa*
Asplenium flabellifolium	*Cheilanthes sieberi*	*Eragrostis parviflora*
Asperula scoparia	*Chenopodium pumilio*	*Eragrostis* sp.
Asperula conferta	*Chloris truncata*	*Erodium crinitum*
Austrodanthonia caespitosa	*Chrysocephalum apiculatum*	*Eryngium ovinum*
Austrodanthonia carphoides	*Chrysocephalum semipapposum*	*Eucalyptus blakelyi*
Austrodanthonia laevis	*Clematis microphylla*	*Eucalyptus bridgesiana*
Austrodanthonia racemosa	*Convolvulus erubescens*	*Eucalyptus dealbata*
Austrodanthonia spp.	*Cotula australis*	*Eucalyptus dives*
Austrostipa bigeniculata	*Cryptandra amara*	*Eucalyptus goniocalyx*
Eucalyptus macrorhyncha	*Joycea pallida*	*Plantago varia*
Eucalyptus mannifera	*Juncus australis*	*Poa sieberiana*
Eucalyptus melliodora	*Juncus subsecundus*	*Poranthera microphylla*
Eucalyptus nortonii	*Juncus sp.*	*Pratia pedunculata*
Eucalyptus polyanthemos	*Kunzea ericoides*	*Pterostylis* sp.
Eucalyptus radiata	***Leucochrysum albicans* var. *tricolor***	*Pultenaea microphylla*
Eucalyptus rossii	*Lepidium sp.*	*Pultenaea procumbens*
Eucalyptus rubida	*Lepidosperma laterale*	*Pseudognaphalium luteoalbum*
Eucalyptus viminalis	*Leptorhynchos squamatus*	*Rumex brownii*
Euchiton sp.	*Leptospermum sp.*	*Schoenus apogon*
Euchiton sphaericus	*Linum marginale*	*Scleranthus biflorus*
Exocarpos cupressiformis	*Lissanthe strigosa*	*Scleranthus diander*
Galium gaudichaudii	*Lomandra bracteata*	*Scirpus* sp.
Gastrodia sp.	*Lomandra filiformis*	*Senecio quadridentatus*
Geranium solanderi	*Lomandra filiformis subsp. coriacea*	*Solenogyne dominii*
Geranium retrorsum	*Lomandra longifolia*	*Stackhousia monogyna*
Geranium sp.	*Lomandra multiflora*	*Stellaria pungens*
Glycine clandestina	*Luzula densiflora*	*Stypandra glauca*
Glycine tabacina	*Luzula sp.*	***Styphelia triflora***
Glycine sp.	*Lythrum hyssopifolia*	*Themeda australis*
Gonocarpus tetragynus	*Melichrus urceolatus*	*Tripogon loliiformis*
Goodenia hederacea	*Microlaena stipoides*	*Tricoryne elatior*
Goodenia pinnatifida	*Microtis unifolia*	*Triptilodiscus pygmaeus*
Grevillea rosmarinifolia	*Microtis* sp.	*Veronica calycina*
Haloragis heterophylla	***Orchidaceae sp.***	*Viola betonicifolia*
Hardenbergia violacea	*Opercularia hispida*	*Vittadinia cuneata*
Hibbertia spp.	*Oxalis perennans*	*Vittadinia gracilis*
Hibbertia obtusifolia	*Panicum effusum*	*Vittadinia muelleri*
Hovea heterophylla	*Panicum* sp.	*Vittadinia* sp.
Hovea linearis	*Pennisetum sp.*	*Wahlenbergia communis*
Hydrocotyle pedunculata	*Persicaria prostrata*	*Wahlenbergia gracilis*
Hydrocotyle laxiflora	*Pimelea curviflora*	*Wahlenbergia stricta*
Hypericum gramineum	*Pimelea* sp.	*Wahlenbergia* sp.
Indigofera australis	*Plantago gaudichaudii*	*Wurmbea dioica*
Juncus filicaulis	*Poa labillardierei*	*Xerochrysum viscosum*

APPENDIX A-2: GRID REFERENCES AND VEGETATION INFORMATION FOR EACH TRANSECT

Site	Polygon	Transect Start		Transect End		EPBC BGW	ACT Climax Vegetation Community
		Easting	Northing	Easting	Northing		
Throsby	1	696982	6103969	696968	6103736	no	YBBRGTGW
Throsby	2	697081	6103330	697717	6102813	yes	YBBRGTGW
Throsby	3	697491	6103467	697451	6103024	no	RSBSGTF
Throsby	4	697757	6102884	697984	6102717	yes	YBBRGTGW
Throsby	5	698202	6102809	698134	6102575	yes	YBBRGTGW
Throsby	6	696469	6104718	696112	6104644	no	YBBRGTGW
Throsby	7	696491	6104435	696678	6104455	no	YBBRGTGW
Throsby	8	697667	6105829	697529	6105610	yes	YBBRGTGW
Throsby	9	697811	6105790	697993	6105731	yes	YBBRGTGW
Throsby	10	698203	6105348	698369	6105477	yes	YBBRGTGW
Throsby	11	697933	6101452	698067	6101550	yes	YBBRGTGW
Throsby	12	698201	6101316	698329	6101273	no	YBBRGTGW
One Tree Hill	13	690582	6109263	690672	6109480	no	RSSGTF
One Tree Hill	14	690591	6108751	690520	6108595	no	RSSGTF
One Tree Hill	15	690067	6108495	690186	6108636	no	RSSGTF
One Tree Hill	16	689951	6108528	689873	6108704	no	RSSGTF
One Tree Hill	17	689020	6107865	688913	6108038	no	RSSGTF
One Tree Hill	18	688868	6107897	688950	6107744	no	RSSGTF
One Tree Hill	19	688109	6107475	688168	6107578	yes	YBBRGTGW
North Leases	20	694876	6108227	695189	6108216	no	RSBSGTF
North Leases	21	693218	6110010	693055	6109823	yes	YBBRGTGW
North Leases	22	692541	6110446	692780	6110421	yes	YBBRGTGW
Kinlyside	23	690402	6108202	690374	6107974	yes	YBBRGTGW
Kinlyside	24	689922	6107487	689771	6107421	yes	YBBRGTGW
Kinlyside	25	689726	6107502	689716	6107352	yes	YBBRGTGW
Kinlyside	26	690364	6107699	690392	6107551	no	RSSGTF
Throsby	26b	697088	6104151	697454	6103978	no	YBBRGTGW
Throsby	27	697417	6104543	697437	6104765	no	YBBRGTGW
Throsby	28	697807	6104880	697805	6104990	no	YBBRGTGW
Throsby	29	697666	6101855	698004	6101842	yes	YBBRGTGW
Throsby	30	697818	6101724	697696	6101728	no	YBBRGTGW
One Tree Hill	31	690468	6109125	690380	6109095	no	RSBSGTF
One Tree Hill	32	690569	6108856	690599	6108777	no	RSBSGTF
One Tree Hill	33	689951	6108482	689779	6108486	no	RSBSGTF
One Tree Hill	34	689935	6108344	689778	6108369	no	RSBSGTF
One Tree Hill	35	688760	6107705	688639	6107683	no	RSBSGTF
One Tree Hill	36	688511	6107818	688633	6107819	yes	YBBRGTGW
One Tree Hill	37	693218	6110009			yes	YBBRGTGW
North Leases	38	695158	6108899	695454	6108947	no	RSBSGTF
North Leases	39	695576	6108707	695753	6108666	no	RSBSGTF
North Leases	40	694871	6108336	695094	6108364	no	RSBSGTF
North Leases	41	693414	6109321	693402	6109192	yes	YBBRGTGW
Kinlyside	41b	689385	6105558	689647	6105462	yes	YBBRGTGW
Kinlyside	42	690164	6105853	690085	6105708	no	RSBSGTF
Kinlyside	43	689943	6105661	690037	6106088	no	RSBSGTF

Site	Polygon	Transect Start		Transect End		EPBC BGW	ACT Climax Vegetation Community
		Easting	Northing	Easting	Northing		
Kinlyside	44	690010	6106186	689915	6106191	yes	YBBRGTGW
Kinlyside	45	690420	6106510	690405	6106361	no	RSBSGTF
North Leases	51	694498	6109339	694354	6109190	no	RSBSGTF
North Leases	52	694444	6109440	694449	6109662	no	RSBSGTF
North Leases	53	694200	6110136	694231	6110011	yes	YBBRGTGW
North Leases	54	693879	6110881	693809	6110884	yes	YBBRGTGW
North Leases	55	693898	6110235	693796	6110322	yes	YBBRGTGW
Kinlyside	56	689875	6107025	689919	6107073	yes	YBBRGTGW
Kinlyside	57	689974	6107067	690029	6107232	no	RSSGTF
Kinlyside	58	690074	6107355	689906	6107254	yes	YBBRGTGW
Kinlyside	59	690246	6107064	690308	6107079	yes	YBBRGTGW
Kinlyside	60	690418	6107287	690217	6107268	yes	YBBRGTGW
Kinlyside	61	690789	6107348	690875	6107461	yes	YBBRGTGW
Kinlyside	62	690929	6107838	690926	6107707	no	YBBRGTGW
Kinlyside	63	690644	6107984	690643	6108049	yes	YBBRGTGW
Kinlyside	64	690686	6107744	690548	6107774	yes	YBBRGTGW
Majura and Gooroo.	65	700082	6100492	700221	6100232	yes	YBBRGTGW
Majura and Gooroo.	66	700365	6100357	700282	6100298	no	YBBRGTGW
Majura and Gooroo.	67	700193	6100632	699958	6100676	no	YBBRGTGW
North Leases & Taylor	68	691869	6109288	691663	6109288	no	YBBRGTGW
North Leases & Taylor	69	691324	6109372	691179	6109488	yes	YBBRGTGW
North Leases & Taylor	70	691751	6108996	691761	6108868	yes	YBBRGTGW
Majura and Gooroo.	71	701008	6101208	700778	6100937	no	RSSGTF
Majura and Gooroo.	72	700084	6101558	699952	6101359	no	YBBRGTGW
Majura and Gooroo.	73	699950	6101067	699886	6101242	yes	YBBRGTGW
Majura and Gooroo.	74	700175	6101783	700058	6101597	yes	YBBRGTGW
Majura and Gooroo.	75	698967	6099321	699276	6099369	yes	YBBRGTGW
Majura and Gooroo.	76	699741	6099016	699840	6098817	no	YBBRGTGW
Majura and Gooroo.	77	699003	6100587	698843	6100440	yes	YBBRGTGW
Majura and Gooroo.	78	698592	6099677	698641	6099684	yes	YBBRGTGW
Taylor	79	691619	6108261	691428	6107945	no	YBBRGTGW
Taylor	80	691173	6107940	691080	6108110	no	YBBRGTGW
Kinlyside	81	690502	6107002	690329	6106764	yes	YBBRGTGW
Kinlyside	82	689771	6106922	690030	6106899	yes	YBBRGTGW
Majura and Gooroo.	100	699829	6100927	699909	6100543	yes	YBBRGTGW
North leases/Taylor	101	692265	6109744	692253	6109378	no	RSBSGTF
North leases/Taylor	102	692470	6109534	692448	6109567	no	RSBSGTF
North leases/Taylor	103	692875	6109271	692810	6109114	no	RSBSGTF
Majura and Gooroo.	104	700257	6101465	700459	6100982	yes	YBBRGTGW
Majura and Gooroo.	105					no	YBBRGTGW
Majura and Gooroo.	106	699000	6099616	698997	6099614	yes	YBBRGTGW
Majura and Gooroo.	107	698870	6099637	698878	6100133	yes	YBBRGTGW
Majura and Gooroo.	108	698665	6100300	698435	6100305	yes	YBBRGTGW
Mt Majura and Gooroo.	110	698870	6099637	698879	6100133	yes	YBBRGTGW
North Leases & Taylor	111	692575	6108459	692461	6108831	no	YBBRGTGW
North Leases & Taylor	112	692084	6109243	692037	6109142	no	YBBRGTGW

Site	Polygon	Transect Start		Transect End		EPBC BGW	ACT Climax Vegetation Community
		Easting	Northing	Easting	Northing		
North Leases & Taylor	113	692037	6109142	692018	6108886	no	YBBRGTGW
One Tree Hill	114	689779	6106364	690047	6106676	yes	YBBRGTGW
One Tree Hill	115	699741	6099016	699790	6098827	no	YBBRGTGW

APPENDIX A-3: SPECIES LIST PER VEGETATION TRANSECT

Table A

Polygon ID	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
EXOTIC SPECIES																			
Acetosella vulgaris		1	1		1	r		r			1	+	1	1	1	2			+
Aira cupaniana																			
Aira sp.																			
Anagallis arvensis								r						1			+		
Anthoxanthum odoratum																			
Arctotheca calendula	r					r									r				
Avena sp.															r				
Briza maxima								r					+	r					r
Briza minor																			
Bromus. diandrus																			
Bromus hordeaceus																			
Bromus sp.							r												
Carthamus lanatus				1									1	1		+	r	+	
Centaurium sp.		r	r					r	r	r	r		+	+			r	+	r
Chondrilla juncea				r												+	r	+	
Citrullus sp.														r	r				
Cirsium vulgare		r	r					r					+				r		
Conyza sp.	1	1	r	+	r		r			r		r	r	+	r	+	r	+	
Crataegus sp.																			
Cynodon dactylon	1			r			r												
Cynosurus echinatus													1	1	r		r		r
Cyperus eragrostis		r				r													
Dactylis glomerata	1																		
Dittrichia graveolens																			
Dittrichia sp.																			
Echium plantagineum																			
Eleusine tristachya												+					r		
Eleusine sp.	+	+		r			r												
Eragrostis cilianensis				+															r
Eragrostis sp.							r			+									
Erodium botrys				+				r											
Erodium cicutarium																			
Erodium sp.																			
Gamochaeta americium											r								
Hirschfeldia incana																			
Holcus lanatus					+	+			r				r	r					
Hordeum sp.																			
Hypericum perforatum																		r	
Hypericum sp.																			
Hypochaeris glabra											1								
Hypochaeris radicata	1	1	1	1			+		+	1	1	1	1	1		1		1	r
Hypochaeris sp.																			
Juncus acutus																			
Juncus sp.			r														+		
Lactuca serriola																			
Lepidium africanum											r								
Linum trigynum																			
Lolium perenne		r																	
Lolium rigidum																			
Malva parviflora																			
Marrubium vulgare																			
Medicago sp.							+		+										
Modiola caroliniana	1					r													
Nassella neesiana																			
Nassella trichotoma		r	r	r		r	+					+		+		+		r	
Onopordum acanthium					+						+								

Polygon ID	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Orobanche minor													r						
Paronychia brasiliana	+	r									r	r			+		r		
Paspalum dilatatum	r			r	r		r					r					1		
Petrorhagia nanteuilii			1										+	+	+			r	
Phalaris aquatica	3	1		2		4	3				r	4		r					
Pinus radiata																			
Plantago lanceolata	1					r													
Polygonum aviculare		r				r													
Portulaca oleracea																			
Rosa rubiginosa				r				r			r		r	1	r		1		
Rubus fruticosus																			
Rumex crispus																			
Salvia verbenaca										r									
Setaria parviflora		1	1	+	r	1		+	+	1							r		
Setaria sp.	1																		
Senecio sp.																			
Silybum marianum																			
Silene gallica																			
Solanum sp.								r											
Solanum nigrum	r				r						1	r	r		r	r			
Sonchus sp.	1			r		r					r		r	r			r		
Sorghum sp.														+					
Taraxacum officinale																			
Tolpis barbata																			
Tolpis umbellata		r						r		r							r	r	
Tragopogon dubius																			
Trifolium angustifolium																			
Trifolium arvense																			
Trifolium repens																			
Trifolium sp.	1	1		r	1	1	2	+		+	r	+	+	+	+	+	r	r	r
Verbascum thapsus																			
Verbascum virgatum													r						
Vulpia sp.																			
NATIVE SPECIES																			
Acacia baileyana																			
Acacia buxifolia																			
Acacia dealbata								r											+
Acacia decurrens																			
Acacia gunnii																r			
Acacia implexa													r						r
Acacia mearnsii															r				
Acacia pycnantha																			
Acacia parramattensis																			
Acacia pravissima														r			r		
Acacia rubida																			
Acacia ulicifolia																			
Acaena echinata																			
Acaena ovina													+	r	+	r	+	+	
Acaena novae-zelandiae										r									
Acaena sp.																			
Agrostis avenacea																			
Allocasuarina verticillata																			
Alternanthera denticulata																			
Alternanthera nana		r		r	r						r			r					
Alternanthera sp.																			
Amyema sp.			r					+						+					
Aristida ramosa								1	+				r		+	2			r
Arthropodium sp.								+											
Asplenium flabellifolium													r						

Polygon ID	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Asperula scoparia														r				r	
Asperula conferta										r									
Astroloma humifusum													r						
Astrotricha ledifolia																			
Austrodanthonia caespitosa																	1	1	
Austrodanthonia carphoides		1				+	+			1	1				+			3	
Austrodanthonia laevis																			
Austrodanthonia racemosa	3	2		1	2	1	4	1	2	3	1	3	2		2	2	1		1
Austrodanthonia sp.			3	2	2														
Austrostipa bigeniculata	3	3	4	4	4	1	1		3	3	3								
Austrostipa densiflora															2				
Austrostipa mollis																			
Austrostipa scabra	3	3	4	4			1	2	3	3	3	1	2	+	2	3	+	1	1
Billardiera sp.																			
Blechnum sp.																			
Bossiaea buxifolia															r				
Bothriochloa macra	1	2	1	2	1		+	1	2	2			r	2			3	3	2
Brachyloma daphnoides																			
Bracteantha viscosa																			
Burchardia umbellata																			
Bursaria spinosa sp. lasiophylla																			
Calocephalus citreus									r	1									
Carex appressa				1															
Carex breviculmis																			
Carex inversa				r									r					r	
Carex sp.																			
Cassinia aculeata																			
Cassinia longifolia															r				
Cassinia quinquefaria											r								
Centipeda cunninghamii				r															
Chamaesyce drummondii		r			r	r		+	+				r					r	
Cheilanthes austrotenuifolia													1					+	
Cheilanthes sieberi								+	r				1	r	r	r	+	+	+
Chenopodium pumilio	1	r			+	r	+				2	r	+		1	r			r
Chloris truncata	2	1	1	1	+	+	1	1		1		+				r		r	
Chrysocephalum apiculatum																			
Chrysocephalum semipapposum																			
Clematis microphylla																			
Convolvulus erubescens			r	r						r			r					r	
Cotula australis															r				
Cryptandra amara																			
Cymbonotus lawsonianus															r		r	+	
Cymbonotus sp.									+										
Cymbopogon refractus																			
Cynoglossum suaveolens							r												
Cynoglossum sp.																			
Daviesia genistifolia																			
Daucus glochidiatus													r						
Desmodium varians				+						r			r	r	r		r	+	+
Dianella longifolia																			
Dianella revoluta																			
Dichelachne micrantha								1											
Dichelachne rara																			
Dichelachne sp.									3			+	1		1		r		
Dichondra repens	1																		
Dichopogon fimbriatus								+	+										
Dillwynia sericea			r					+											
Dodonaea viscosa																			
Einadia nutans			r	r							1		1		1	r			

Polygon ID	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Eleocharis acuta								+											
Elymus scaber	r	+	r																
Enneapogon nigricans																			
Epilobium billardiereanum	r			r															
Eragrostis brownii		1				+	+	+											
Eragrostis trachycarpa																			
Eragrostis parviflora																			
Eragrostis sp.					2														
Erodium crinitum																			
Eryngium ovinum																			
Eucalyptus blakelyi		1		r	2	2		1			1			+			1		r
Eucalyptus bridgesiana																			
Eucalyptus dealbata																			
Eucalyptus dives																	1		
Eucalyptus goniocalyx													2	1	2		2		
Eucalyptus macrorhyncha											1			1			2		r
Eucalyptus mannifera								2			2						1		
Eucalyptus melliodora								2			2								
Eucalyptus nortonii																			
Eucalyptus polyanthemos																			
Eucalyptus radiata																			
Eucalyptus rossii													2		2				
Eucalyptus rubida																			
Eucalyptus viminalis																			
Eucalyptus sp.																			
Euchiton sp.	1		r	r	r		r	1	1	+			r	r					
Euchiton sphaericus															r		+	+	
Exocarpos cupressiformis																			
Galium gaudichaudii																			
Gastrodia sp.																			
Geranium solanderi			1										+	r					
Geranium retrorsum																			
Geranium sp.																			
Glycine clandestina															r			+	
Glycine tabacina		r				+												+	
Glycine sp.																			
Gonocarpus tetragynus			+					1	+	r	r				r			+	+
Goodenia hederacea								+		+									
Goodenia pinnatifida		+																	
Grevillea rosmarinifolia																			
Haloragis heterophylla		+		+		r		1	1	1				r			1		
Hardenbergia violacea																			
Hibbertia sp.																			
Hibbertia obtusifolia															r	+			r
Hovea heterophylla																			
Hovea linearis																			
Hydrocotyle pedunculata								r											
Hydrocotyle laxiflora													1	+		+	r	+	r
Hypericum gramineum		1				r		1	1	1	r						+		
Indigofera australis																			
Joycea pallida			+					1					+		r				+
Juncus australis	1			+										r					
Juncus filicaulis																			
Juncus subsecundus		r						+		r							+	r	
Juncus sp.					r														
Kunzea ericoides																			
Leucochrysum albicans var. *tricolor*																			
Lepidium sp.																			
Lepidosperma laterale													r		+				

Polygon ID	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Leptorhynchos squamatus																			
Leptospermum sp.																			
Linum marginale																			
Lissanthe strigosa								r											
Lomandra bracteata																			
Lomandra filiformis			r																
Lomandra filiformis subsp. *coriacea*			r					+		r			+	r	+		r		+
Lomandra longifolia																			
Lomandra multiflora			r					r											
Luzula densiflora																			
Lythrum hyssopifolia	r			r	+			r	+		r	r					+		
Melichrus urceolatus															r		r	r	+
Microlaena stipoides	1	+	+	+				1	+		r		1	4	2	1	+		+
Microtis unifolia									r										
Microtis sp.																			
Orchidaceae sp.																		+	
Opercularia hispida																			
Oxalis perennans	1	r	+	+	r	r	r	r	r	r	r	r	+	1	+	1			r
Panicum effusum	1	r	+	+	+			2	1	1	r	1	r	2		r	1	1	+
Pennisetum sp.																			
Persicaria prostrata				r					r										
Pimelea curviflora																			
Pimelea sp.																			
Plantago gaudichaudii																			
Plantago varia			r										+						
Poa labillardierei																			
Poa sieberiana			r										1		r			r	
Poranthera microphylla															r				
Pratia pedunculata																			
Pterostylis sp.																			
Pultenaea microphylla																			
Pultenaea procumbens																			
Pseudognaphalium luteoalbum	r				r	r		r											
Rumex brownii	1			+			+	r					r	1	+			r	r
Schoenus apogon		r		r		+		+	+	+	r			+			1	+	
Scleranthus biflorus															+				
Scleranthus diander																			
Scirpus sp.																			
Senecio quadridentatus													r						
Solenogyne dominii		r				r		1			r							+	+
Stackhousia monogyna																		r	
Stellaria pungens													+		+	1			
Stypandra glauca															r				
Styphelia triflora																			
Themeda australis				+				2	3	1				r		r	3	3	3
Tripogon loliiformis																			
Tricoryne elatior			r					r		+							r	+	+
Triptilodiscus pygmaeus																			
Veronica calycina																			
Viola betonicifolia																			
Vittadinia cuneata			r					+		1			1						+
Vittadinia gracilis																			+
Vittadinia muelleri		r					r	+	r	1						+	r	+	
Wahlenbergia communis				r	r					1			1		1	+		+	
Wahlenbergia gracilis			1		r			+	+	1					1			+	
Wahlenbergia stricta																			
Wahlenbergia sp.	1																		
Wurmbea dioica																			
Xerochrysum viscosum																			

Table B

Polygon ID	20	21	22	23	24	25	26	26b	27	28	29	30	31	32	33	34	35	36	37
EXOTIC SPECIES																			
Acetosella vulgaris	r			r	+	r		+	+	1	+	1	2	1	2	2	1	1	1
Aira cupaniana																			
Aira sp.																	r	+	
Anagallis arvensis		r		+		+			r					1	+				
Anthoxanthum odoratum																			
Arctotheca calendula																			
Avena sp.																			
Briza maxima				+	+		r												
Briza minor						+													
Bromus. diandrus																			
Bromus hordeaceus																			
Bromus sp.					r														
Carthamus lanatus						r								1		+	r		
Centaurium sp.		+	r	+	r	+					+				1	1	1	1	1
Chondrilla juncea		r	r	r												1	+		+
Citrullus sp.																			
Cirsium vulgare	r		r		r								+		+	r	r	r	
Conyza sp.		r		r	r	r			r		1	1	+	1	1	1		r	
Crataegus sp.																			
Cynodon dactylon						+													
Cynosurus echinatus				+	1	r	r							+	1	1	2	1	1
Cyperus eragrostis																			
Dactylis glomerata								2											
Dittrichia graveolens																			
Dittrichia sp.																			
Echium plantagineum													r						
Eleusine tristachya												1							
Eleusine sp.									+	+									
Eragrostis cilianensis																			
Eragrostis sp.			+	+					+										
Erodium botrys																			
Erodium cicutarium																			
Erodium sp.																			
Gamochaeta americium				r															
Hirschfeldia incana					+														
Holcus lanatus				r	r	+				r				r	+				
Hordeum sp.								r	r										
Hypericum perforatum																			
Hypericum sp.																			
Hypochaeris glabra								r		+									
Hypochaeris radicata	+	1	+	r		+	+					1		1	2	2	1	+	1
Hypochaeris sp.									r		1		+						
Juncus acutus																			
Juncus sp.								r											
Lactuca serriola																			
Lepidium africanum												+							
Linum trigynum																			
Lolium perenne																			
Lolium rigidum																			
Malva parviflora									r										
Marrubium vulgare																			
Medicago sp.																			
Modiola caroliniana					r														
Nassella neesiana																			
Nassella trichotoma	1	1	+	+	r	r								+	1	1	+		
Onopordum acanthium					r			+				2	+						
Orobanche minor					r														

Polygon ID	20	21	22	23	24	25	26	26b	27	28	29	30	31	32	33	34	35	36	37
Paronychia brasiliana					r			1	1	+		2							
Paspalum dilatatum										r									
Petrorhagia nanteuilii	r		r	+	+	+					1		1	1	1	1	1	1	1
Phalaris aquatica		1			r			3	3	2	+	3							
Pinus radiata																			
Plantago lanceolata						r													
Polygonum aviculare																			
Portulaca oleracea																			
Rosa rubiginosa	r	1		+	r	r							+	4	+	r	r	r	+
Rubus fruticosus																			
Rumex crispus								r		r		+							
Salvia verbenaca								r											
Setaria parviflora				r		r													
Setaria sp.									1	1									
Senecio sp.																			
Silybum marianum																			
Silene gallica																			
Solanum sp.								r											
Solanum nigrum			r		1				+		r	1	1		+				
Sonchus sp.	r				r										r		r		
Sorghum sp.																			
Taraxacum officinale												+							
Tolpis barbata																			
Tolpis umbellata			r		r	r					r					r	r		
Tragopogon dubius														r	r				
Trifolium angustifolium																			
Trifolium arvense																			
Trifolium repens																			
Trifolium sp.	+	1	r	+	+	r		2	2	2	+	2	2	1	1	1	1		1
Verbascum thapsus																r			
Verbascum virgatum																			
Vulpia sp.	r				r														
NATIVE SPECIES																			
Acacia baileyana																			
Acacia buxifolia																			
Acacia dealbata	1														r	r			+
Acacia decurrens																		+	
Acacia gunnii	r																		
Acacia implexa														+					
Acacia mearnsii	1																		
Acacia pycnantha														r					
Acacia parramattensis																r			
Acacia pravissima				r															
Acacia rubida																			
Acacia ulicifolia																			
Acaena echinata																			
Acaena ovina	+	r	+	+	r	r								1	1	1	+		1
Acaena novae-zelandiae													2						
Acaena sp.																			
Agrostis avenacea																			
Allocasuarina verticillata																			
Alternanthera denticulata																			
Alternanthera nana																			
Alternanthera sp.								r		+									
Amyema sp.																			
Aristida ramosa				+	r	1	+				+				2	2	1	1	
Arthropodium sp.	+																		
Asplenium flabellifolium													r						
Asperula scoparia		+		r															
Asperula conferta													1						

Polygon ID	20	21	22	23	24	25	26	26b	27	28	29	30	31	32	33	34	35	36	37
Astroloma humifusum							+												
Astrotricha ledifolia																			
Austrodanthonia caespitosa	1		1																
Austrodanthonia carphoides	1			1		2													
Austrodanthonia laevis																			
Austrodanthonia racemosa	2		4	2	4														
Austrodanthonia sp.							1	3	3	2	4	1	2	2	2	3		2	
Austrostipa bigeniculata	2										2			2			3	2	
Austrostipa densiflora																			
Austrostipa mollis																			
Austrostipa scabra	2	1		1	1		2					1		2		3	3		2
Billardiera sp.																			
Blechnum sp.																			
Bossiaea buxifolia	r						1												
Bothriochloa macra	+	1	1	3	1	1		+	+	+	3			1	1	2	2	2	2
Brachyloma daphnoides																			
Bracteantha viscosa																			
Burchardia umbellata						r													
Bursaria spinosa sp. lasiophylla																			
Calocephalus citreus																			
Carex appressa																			
Carex breviculmis																			
Carex inversa		+			r														
Carex sp.																			
Cassinia aculeata																			
Cassinia longifolia	1														r	r		+	
Cassinia quinquefaria																			
Centipeda cunninghamii						r													
Chamaesyce drummondii			r					+	1	1			+	r	1	1			
Cheilanthes austrotenuifolia							1				r		+						
Cheilanthes sieberi	+		+	1		+	1									1	1	1	
Chenopodium pumilio	r				1	r			1		r	+							
Chloris truncata				r				+	1	2	1								
Chrysocephalum apiculatum											r								+
Chrysocephalum semipapposum																			
Clematis microphylla																			
Convolvulus erubescens			r										1	1		1	1	1	1
Cotula australis					1														
Cryptandra amara																			
Cymbonotus lawsonianus	+	+		1		r							r	+	+	+	r		1
Cymbonotus sp.																			
Cymbopogon refractus																		1	
Cynoglossum suaveolens		r																	
Cynoglossum sp.																			
Daviesia genistifolia					r														
Daucus glochidiatus																			
Desmodium varians	+		+	+															
Dianella longifolia																			
Dianella revoluta																			
Dichelachne micrantha	+																		
Dichelachne rara		r	1																
Dichelachne sp.											2				2	+	+	3	
Dichondra repens																			
Dichopogon fimbriatus																			
Dillwynia sericea							+												
Dodonaea viscosa																			
Einadia nutans	+			+	r			+				1	2		1		1	1	
Eleocharis acuta																			
Elymus scaber			+					1		1	1				1				1

Polygon ID	20	21	22	23	24	25	26	26b	27	28	29	30	31	32	33	34	35	36	37
Enneapogon nigricans																		1	
Epilobium billardiereanum				1					r		r								1
Eragrostis brownii										1	+								
Eragrostis trachycarpa																			
Eragrostis parviflora																			
Eragrostis sp.						r		1											
Erodium crinitum																			
Eryngium ovinum		r																	
Eucalyptus blakelyi				2	2						+	r						2	r
Eucalyptus bridgesiana	r																		
Eucalyptus dealbata																			
Eucalyptus dives													1	+	3	r			
Eucalyptus goniocalyx			1	+	2		3						2	2		r	2		
Eucalyptus macrorhyncha	3	r			2		3						2	2	+	r	2	1	
Eucalyptus mannifera														2					
Eucalyptus melliodora	1	+	1	2			1										2	2	
Eucalyptus nortonii														2			2	2	
Eucalyptus polyanthemos														2					
Eucalyptus radiata																			
Eucalyptus rossii							+						2						
Eucalyptus rubida																			
Eucalyptus viminalis																			
Eucalyptus sp.								+	+										
Euchiton sp.				1	1	1		+	r	+	1		+	1	1	+	1	1	1
Euchiton sphaericus	+	+	1																
Exocarpos cupressiformis																			
Galium gaudichaudii																		r	
Gastrodia sp.																			
Geranium solanderi	r		+	+	+			r	+						1		1		1
Geranium retrorsum																			
Geranium sp.																			
Glycine clandestina											1				1				1
Glycine tabacina														1			1	1	
Glycine sp.													+						
Gonocarpus tetragynus	1		1	1	1	1	1				r				+	1			1
Goodenia hederacea	1						r											+	
Goodenia pinnatifida																			
Grevillea rosmarinifolia																			
Haloragis heterophylla		1	1	1					r	r	1					1			1
Hardenbergia violacea													r						
Hibbertia sp.																			
Hibbertia obtusifolia	+			+			+								+	r	r	+	+
Hovea heterophylla																			
Hovea linearis																			
Hydrocotyle pedunculata																			
Hydrocotyle laxiflora		+	+	+	1		+						3	1	+	1	2	2	
Hypericum gramineum	+	1	+			1	+			r	1				+				2
Indigofera australis																			
Joycea pallida	2			+	+		3						1		1				
Juncus australis									r	+	+								
Juncus filicaulis		+													+			r	
Juncus subsecundus		+	r	r	r									1					
Juncus sp.																			
Kunzea ericoides																			
Leucochrysum albicans var. *tricolor*																			
Lepidium sp.																			
Lepidosperma laterale																			
Leptorhynchos squamatus				+	r		1												
Leptospermum sp.																			

Polygon ID	20	21	22	23	24	25	26	26b	27	28	29	30	31	32	33	34	35	36	37
Linum marginale																			
Lissanthe strigosa																			
Lomandra bracteata											1		1						
Lomandra filiformis	1		+												+	+	+	r	
Lomandra filiformis subsp. *coriacea*	1		+		+		+												
Lomandra longifolia																			
Lomandra multiflora		r					r						r						r
Luzula densiflora			r																1
Lythrum hyssopifolia		r				1				2	+	+						+	r
Melichrus urceolatus	+		+	r	+	+	1								+	r	+	+	+
Microlaena stipoides			1	+	1	1	1	+	+		+		4	1	4	3	3	2	
Microtis unifolia		r	+	+		r									r	r			r
Microtis sp.	r																		
Orchidaceae sp.	r																		
Opercularia hispida													2						
Oxalis perennans	+			+	+	+			+	r	1	1	1	1	1	1	1	1	r
Panicum effusum			+	1	1	+	+	1	+	1	1	1		1	1	2	+	1	2
Pennisetum sp.													1						
Persicaria prostrata																			
Pimelea curviflora							+												
Pimelea sp.																			
Plantago gaudichaudii																			
Plantago varia													+				r		
Poa labillardierei																			2
Poa sieberiana	r	+	+	1			+				1		1	+	1	+	+	r	2
Poranthera microphylla	+														r				
Pratia pedunculata																			
Pterostylis sp.													r						
Pultenaea microphylla																			
Pultenaea procumbens							r												
Pseudognaphalium luteoalbum						r													
Rumex brownii		+		+	+				+				+				r		
Schoenus apogon	+		1	1			+												
Scleranthus biflorus				r	r														
Scleranthus diander																			
Scirpus sp.																			
Senecio quadridentatus				r	r						+								
Solenogyne dominii	r		1	r		r					1								r
Stackhousia monogyna																			r
Stellaria pungens													3		2	1			
Stypandra glauca																		1	
Styphelia triflora																			
Themeda australis	2	4	2	3	1	3	2		r	r				r	+	r	r	1	4
Tripogon loliiformis																			
Tricoryne elatior				+															
Triptilodiscus pygmaeus						r													
Veronica calycina																			
Viola betonicifolia			+												1				
Vittadinia cuneata																			r
Vittadinia gracilis																			
Vittadinia muelleri	+	+	1	+						r				r	r	r	r	+	r
Wahlenbergia communis											1						+	1	
Wahlenbergia gracilis	1		+	+	1	r										r		1	
Wahlenbergia stricta	1			+	1		r						1						
Wahlenbergia sp.		r																	
Wurmbea dioica				r															
Xerochrysum viscosum																			

Table C

Polygon ID	38	39	40	41	41b	42	43	44	45	51	52	53	54	55	56	57	58	59	60
EXOTIC SPECIES																			
Acetosella vulgaris	1	r	2	1	2	2	3				+	+		r			+		+
Aira cupaniana																			
Aira sp.													r						
Anagallis arvensis	r	r	+	r				r						r					
Anthoxanthum odoratum																			
Arctotheca calendula																			
Avena sp.																			
Briza maxima								r	1						1	1	1	1	1
Briza minor												r							
Bromus. diandrus																			
Bromus hordeaceus																	+		+
Bromus sp.				r															
Carthamus lanatus	r						1												
Centaurium sp.	1		1						1	+	+			1	r	+		r	1
Chondrilla juncea	r		1	r			1												
Citrullus sp.																			
Cirsium vulgare	r	r		r		r				+	r	r		+			r	r	
Conyza sp.	+	r			+						r			+			r		
Crataegus sp.				+															
Cynodon dactylon																			
Cynosurus echinatus							1		1	+		1			+	1	2	2	
Cyperus eragrostis																			
Dactylis glomerata					1									+					
Dittrichia graveolens																			
Dittrichia sp.																			
Echium plantagineum																			
Eleusine tristachya																			
Eleusine sp.					1														
Eragrostis cilianensis							1												
Eragrostis sp.																			
Erodium botrys																			
Erodium cicutarium																			
Erodium sp.							r												
Gamochaeta americium																			
Hirschfeldia incana																			
Holcus lanatus			r		1	1	1	r											+
Hordeum sp.																			
Hypericum perforatum							r												
Hypericum sp.																			
Hypochaeris glabra																			
Hypochaeris radicata	1	r	2	1			+	+	1	1	+	1	+	1	1	+	+	+	+
Hypochaeris sp.																			
Juncus acutus																			
Juncus sp.																			
Lactuca serriola													r						
Lepidium africanum																			
Linum trigynum																			
Lolium perenne																			
Lolium rigidum												+							
Malva parviflora					1														
Marrubium vulgare		r																	
Medicago sp.																			
Modiola caroliniana																			
Nassella neesiana																			
Nassella trichotoma		r	1	2						2	2	1		2		r			r
Onopordum acanthium						r	2												
Orobanche minor																+	r	+	

Polygon ID	38	39	40	41	41b	42	43	44	45	51	52	53	54	55	56	57	58	59	60
Paronychia brasiliana					1						r								
Paspalum dilatatum					+														
Petrorhagia nanteuilii	1	r	1	1		1	1	+	1	1	+	1	r	+		+	+	+	
Phalaris aquatica					1	1	2											+	
Pinus radiata																			
Plantago lanceolata	r				+			r							+			+	1
Polygonum aviculare																			
Portulaca oleracea																			
Rosa rubiginosa			r	+	r	+	1	r								r	r	1	+
Rubus fruticosus																			
Rumex crispus			r																
Salvia verbenaca							+												
Setaria parviflora																			
Setaria sp.			+																
Senecio sp.													+						
Silybum marianum																			
Silene gallica																			
Solanum sp.																			
Solanum nigrum		r																	
Sonchus sp.		r																	
Sorghum sp.																			
Taraxacum officinale																			
Tolpis barbata																			
Tolpis umbellata			+				+			+		+							+
Tragopogon dubius																			
Trifolium angustifolium																			
Trifolium arvense																			
Trifolium repens																			
Trifolium sp.			2	1	3	1	3		r	+	+						r		+
Verbascum thapsus							r												
Verbascum virgatum																			
Vulpia sp.				+								1	+						
NATIVE SPECIES																			
Acacia baileyana																			
Acacia buxifolia													r						
Acacia dealbata	2		+	r						+	r	+		+					
Acacia decurrens	2	+																	
Acacia gunnii											+								
Acacia implexa				r		+													
Acacia mearnsii			+				r												
Acacia pycnantha																			
Acacia parramattensis	2	+																	
Acacia pravissima																			
Acacia rubida													r						
Acacia ulicifolia																			
Acaena echinata																			
Acaena ovina	1	r	1	1	1		+	+		1		+		1				1	r
Acaena novae-zelandiae																			
Acaena sp.																			
Agrostis avenacea														1					
Allocasuarina verticillata																			
Alternanthera denticulata																			
Alternanthera nana																			
Alternanthera sp.																			
Amyema sp.																			
Aristida ramosa	1	2		+	1	+	2	2	1		1				2		1	+	1
Arthropodium sp.																			
Asplenium flabellifolium																			
Asperula scoparia																			
Asperula conferta				+								1		1					

Polygon ID	38	39	40	41	41b	42	43	44	45	51	52	53	54	55	56	57	58	59	60
Astroloma humifusum																			
Astrotricha ledifolia									r										
Austrodanthonia caespitosa								2											
Austrodanthonia carphoides																			
Austrodanthonia laevis																			
Austrodanthonia racemosa							2	2		2			1						
Austrodanthonia sp.	3		3						2		2	1		1	1	3	2	2	1
Austrostipa bigeniculata			3		3		3												
Austrostipa densiflora																			
Austrostipa mollis																			
Austrostipa scabra		3	3		3	2	3	1	2	1	1						3	2	1
Billardiera sp.															r				
Blechnum sp.																		+	
Bossiaea buxifolia	+																		
Bothriochloa macra	1		r	1		+	3	3	1		1	1		1	1	2	2	2	3
Brachyloma daphnoides	r															r			
Bracteantha viscosa																			
Burchardia umbellata																			
Bursaria spinosa sp. lasiophylla																			
Calocephalus citreus																			
Carex appressa																			
Carex breviculmis																			
Carex inversa				r										+					
Carex sp.																			
Cassinia aculeata		r												r					
Cassinia longifolia	2		+			+			r				+			r			
Cassinia quinquefaria																	r		
Centipeda cunninghamii														r					
Chamaesyce drummondii	1		1			1													
Cheilanthes austrotenuifolia																			
Cheilanthes sieberi		+		r				1	1						+		r	1	
Chenopodium pumilio					1												r		
Chloris truncata	1				1		1												
Chrysocephalum apiculatum					r			+									+	r	r
Chrysocephalum semipapposum																		r	
Clematis microphylla	r																		
Convolvulus erubescens	1																		
Cotula australis																			
Cryptandra amara																			
Cymbonotus lawsonianus	r							+	1										
Cymbonotus sp.										r		r		+			+		r
Cymbopogon refractus																			
Cynoglossum suaveolens																			
Cynoglossum sp.												r							
Daviesia genistifolia																			
Daucus glochidiatus										+									
Desmodium varians				1				1	1	1	+			1				+	
Dianella longifolia																			
Dianella revoluta																			
Dichelachne micrantha		2	1									r	+						r
Dichelachne rara																			
Dichelachne sp.																			
Dichondra repens				+						+		+							
Dichopogon fimbriatus																			
Dillwynia sericea		r	r						r										
Dodonaea viscosa																		r	
Einadia nutans		+			1	1		1	+		r			+					
Eleocharis acuta																			

Polygon ID	38	39	40	41	41b	42	43	44	45	51	52	53	54	55	56	57	58	59	60
Elymus scaber	+	1	1	1		1		1	1		+								
Enneapogon nigricans					1		1										r		
Epilobium billardiereanum														+					
Eragrostis brownii																			
Eragrostis trachycarpa																			
Eragrostis parviflora																			
Eragrostis sp.	+				1														
Erodium crinitum																			
Eryngium ovinum																			
Eucalyptus blakelyi					+			2							2	r	2	2	2
Eucalyptus bridgesiana																+		2	+
Eucalyptus dealbata																			
Eucalyptus dives							+									+			
Eucalyptus goniocalyx		2									2		2		+	r	r		
Eucalyptus macrorhyncha	2	3	+	+	r	2		1	+	2		+	2		+	+		r	
Eucalyptus mannifera													r		1	+			
Eucalyptus melliodora		+	r	2	+	r	r	2	r			2	r	2	+		2	+	r
Eucalyptus nortonii						2	r	2	2							2	1		
Eucalyptus polyanthemos																			
Eucalyptus radiata																			
Eucalyptus rossii		2				2													
Eucalyptus rubida																			
Eucalyptus viminalis										2	2								
Eucalyptus sp.																			
Euchiton sp.	1	1	1	1	1	+	r	1		1	r	1	r	1	1	+	1		+
Euchiton sphaericus																			
Exocarpos cupressiformis		r				r					r								
Galium gaudichaudii				+															
Gastrodia sp.								r											
Geranium solanderi			1	1				r		+				+					
Geranium retrorsum																	+		
Geranium sp.												+							
Glycine clandestina	1	+		r	+				+							+		r	
Glycine tabacina	1		+		+			+											
Glycine sp.																			
Gonocarpus tetragynus		2	1	+		1			1	+	1	1	+	1	1	1	+	+	
Goodenia hederacea	+	1	r			1					1		+		1				
Goodenia pinnatifida																			
Grevillea rosmarinifolia																			
Haloragis heterophylla					+									1					1
Hardenbergia violacea						r													
Hibbertia sp.									r										
Hibbertia obtusifolia	+	1	r			1				+	1		1		1		r	+	
Hovea heterophylla																			r
Hovea linearis						r													
Hydrocotyle pedunculata																			
Hydrocotyle laxiflora	2		1			r		2	1	1	1	1	1	1	1	1	1	1	1
Hypericum gramineum	1	+		1	1					1	+	1		1	1			r	1
Indigofera australis						r											r		
Joycea pallida	1	3				+			3	+	1		1		2	2	2		
Juncus australis			+																
Juncus filicaulis																			
Juncus subsecundus		r		r		r			r							r			
Juncus sp.																	r		
Kunzea ericoides																			
Leucochrysum albicans var. *tricolor*																			
Lepidium sp.																			
Lepidosperma laterale																			
Leptorhynchos squamatus															+				

Polygon ID	38	39	40	41	41b	42	43	44	45	51	52	53	54	55	56	57	58	59	60
Leptospermum sp.																			
Linum marginale																			
Lissanthe strigosa																			
Lomandra bracteata																			
Lomandra filiformis	1	1		+		1	+	1	1	r	r		1	1		r			
Lomandra filiformis subsp. *coriacea*		1	+									1			1	+	1	1	+
Lomandra longifolia																			
Lomandra multiflora						r		+							r				
Luzula densiflora									r				r						r
Lythrum hyssopifolia			+		r									1					
Melichrus urceolatus	+	r				+	r		1						1	+	+	1	
Microlaena stipoides	1		1	1	1			1	r	1	1						1	1	2
Microtis unifolia	r		+											r		r	r	r	
Microtis sp.																			
Orchidaceae sp.																			
Opercularia hispida																			
Oxalis perennans	1	r	+	+		r	r	+	1	+		+		+			r		
Panicum effusum	1		1		+	+	2	1	r					+			r		
Pennisetum sp.																			
Persicaria prostrata																			
Pimelea curviflora	+								r	1	+								
Pimelea sp.																			
Plantago gaudichaudii																			
Plantago varia		r				r		+						r			r	+	
Poa labillardierei				1						1				+					1
Poa sieberiana	1	1	+			1		1	1		2	2	1		2	1	1	2	
Poranthera microphylla	r									r	r	r	1	+				r	
Pratia pedunculata																			
Pterostylis sp.																			
Pultenaea microphylla		2																	
Pultenaea procumbens																			
Pseudognaphalium luteoalbum																			
Rumex brownii													r	+					r
Schoenus apogon												1			2		1	+	1
Scleranthus biflorus																			
Scleranthus diander														+				r	
Scirpus sp.																			
Senecio quadridentatus																			
Solenogyne dominii	+	+		1				+	r	r	+	1			+	+	1		1
Stackhousia monogyna					r														
Stellaria pungens										+			+	1					
Stypandra glauca																			
Styphelia triflora																			
Themeda australis	3		+	2	r			r	3	+		4		4	2	1	2	3	3
Tripogon loliiformis																			
Tricoryne elatior												+							
Triptilodiscus pygmaeus												r			+				
Veronica calycina										r		r							
Viola betonicifolia				1						1		r							
Vittadinia cuneata					+	r	1	r	+								r		
Vittadinia gracilis															r	r			
Vittadinia muelleri	1	r					1	r				r		r					
Wahlenbergia communis	1	1						1											
Wahlenbergia gracilis	1	1																	
Wahlenbergia stricta		1																	
Wahlenbergia sp.				1	+	+	r		+			r	r	0	r			r	
Wurmbea dioica																			
Xerochrysum viscosum																			

Table D

Polygon ID	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79
EXOTIC SPECIES																			
Acetosella vulgaris	2	1		1		1			+	1	1	+		1	1		1	1	1
Aira cupaniana																			
Aira sp.											r								
Anagallis arvensis	r		+	+	r	+	+		+						r				
Anthoxanthum odoratum																			
Arctotheca calendula				+	+		r								1				+
Avena sp.		r																	
Briza maxima			1					1		1								+	
Briza minor			r		r														
Bromus. diandrus													1						
Bromus hordeaceus														+					
Bromus sp.	r				1														1
Carthamus lanatus	r			+	1	+	+		+					+	2	1			
Centaurium sp.			1	+	r	+	r	+		1	1	1	1	1			+	1	
Chondrilla juncea	2	1		1	+									+	r				
Citrullus sp.																			
Cirsium vulgare	r	r	1	+	+	+	+		+			+	1	1		1			
Conyza sp.	r	r	+	+	+		+			+	1		1		+	1		+	
Crataegus sp.												r							
Cynodon dactylon																			
Cynosurus echinatus		+	1	1				1		1			1					+	
Cyperus eragrostis					+														
Dactylis glomerata																			
Dittrichia graveolens																			
Dittrichia sp.							r						r						
Echium plantagineum				r			r							+		+	+		1
Eleusine tristachya							1												
Eleusine sp.																			
Eragrostis cilianensis																1			
Eragrostis sp.																			
Erodium botrys	r																		1
Erodium cicutarium					r		r								+				
Erodium sp.																			
Gamochaeta americium																			
Hirschfeldia incana					r									1		1	+		
Holcus lanatus		1	+	1	r								+						1
Hordeum sp.														+					
Hypericum perforatum						1	+		+			+					+		1
Hypericum sp.																			
Hypochaeris glabra																			
Hypochaeris radicata	1	1	1		+	1	1	1	1			1	1	1	1	+	+	+	1
Hypochaeris sp.																			
Juncus acutus																			
Juncus sp.																			
Lactuca serriola		r													r				
Lepidium africanum																			
Linum trigynum																			
Lolium perenne																			
Lolium rigidum																			
Malva parviflora					+										r				r
Marrubium vulgare														+	1	+			
Medicago sp.																			
Modiola caroliniana					r	+	+		r				r			1			
Nassella neesiana																			
Nassella trichotoma				+			r		+	+	1	1	1	1	1	1	+		
Onopordum acanthium					1								r			1			
Orobanche minor				+									r						

Polygon ID	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79
Paronychia brasiliana					+		1				+			+	1		+		
Paspalum dilatatum													+			1			
Petrorhagia nanteuilii			1	1					+					1	1	+	+	+	
Phalaris aquatica					+	r			+				1	1					3
Pinus radiata													r						
Plantago lanceolata					1	1	1			1		+	1	1					1
Polygonum aviculare					1		1												+
Portulaca oleracea																			
Rosa rubiginosa				+		r		+	1	+		+	1						
Rubus fruticosus					r														
Rumex crispus					r														+
Salvia verbenaca							r		r			r							
Setaria parviflora																			
Setaria sp.						+	+						r						1
Senecio sp.																			
Silybum marianum													r						
Silene gallica																			
Solanum sp.																			
Solanum nigrum		r		+	1	+							r	1	1	+			
Sonchus sp.				r	r	r						r	r		r				
Sorghum sp.																			
Taraxacum officinale				r															
Tolpis barbata																			
Tolpis umbellata	1		1				r						r						
Tragopogon dubius																			
Trifolium angustifolium																			
Trifolium arvense								r											
Trifolium repens																			
Trifolium sp.	2	1		1	1		1		1	+	1	1		1	1	2	1		2
Verbascum thapsus	r	r		r							r								
Verbascum virgatum	r																		
Vulpia sp.		1	1																
NATIVE SPECIES																			
Acacia baileyana												r						+	
Acacia buxifolia																			
Acacia dealbata						+						1	1						
Acacia decurrens																			
Acacia gunnii																			
Acacia implexa												+	r		+		+	+	
Acacia mearnsii			+			1		+	+	+	1				r		+	1	
Acacia pycnantha																			
Acacia parramattensis																			
Acacia pravissima																			
Acacia rubida																			
Acacia ulicifolia															r				
Acaena echinata																			
Acaena ovina		+		+	r	1		1	+	1	1	1	1	1	1		1	+	r
Acaena novae-zelandiae	+												r						
Acaena sp.			r																
Agrostis avenacea					1				1				+						
Allocasuarina verticillata											1							r	
Alternanthera denticulata		r			r	r								+			r		
Alternanthera nana																			
Alternanthera sp.																			
Amyema sp.																			
Aristida ramosa			3			+							+	1			1	1	
Arthropodium sp.																			
Asplenium flabellifolium											r								
Asperula scoparia																			
Asperula conferta									+			+	+	+					

Polygon ID	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79
Astroloma humifusum				r				r										+	
Astrotricha ledifolia																			
Austrodanthonia caespitosa																			
Austrodanthonia carphoides					3		2												
Austrodanthonia laevis																			
Austrodanthonia racemosa						2							2						
Austrodanthonia sp.	1	+	2	2	1			1	2	1		2		2	2	1	2	1	1
Austrostipa bigeniculata					2		2					+	+	2	2	3	1		2
Austrostipa densiflora											2		1		1		2	+	
Austrostipa mollis																			
Austrostipa scabra	3	2		1	1		+		2	2	1	+		1	3	2	2	2	
Billardiera sp.																			
Blechnum sp.																			
Bossiaea buxifolia																			
Bothriochloa macra	3			2	4	2	2	1	1		2	1	1	2	1	3	1	2	
Brachyloma daphnoides																			
Bracteantha viscosa											r								
Burchardia umbellata																			
Bursaria spinosa subsp. *lasiophylla*											r								
Calocephalus citreus																			
Carex appressa														+					
Carex breviculmis																			
Carex inversa				+	1								+	r					
Carex sp.																			
Cassinia aculeata																			
Cassinia longifolia											r	r					r	+	
Cassinia quinquefaria		r																	
Centipeda cunninghamii										r									
Chamaesyce drummondii	r														+				
Cheilanthes austrotenuifolia											r		r		+			1	
Cheilanthes sieberi				r					r	+	1		r		1		r	1	
Chenopodium pumilio	+	r		+	+		+				r			r	1			+	
Chloris truncata	+				1	+										1	r		1
Chrysocephalum apiculatum									r		r	+		+			1	2	
Chrysocephalum semipapposum												1							
Clematis microphylla																			
Convolvulus erubescens					r							r			r				
Cotula australis																			
Cryptandra amara																			
Cymbonotus lawsonianus																			
Cymbonotus sp.			+	r	+						+	r					r	+	
Cymbopogon refractus																			
Cynoglossum suaveolens																			
Cynoglossum sp.																r			
Daviesia genistifolia												+						+	
Daucus glochidiatus																			
Desmodium varians	+	r		r							r	1	+		r				
Dianella longifolia													r						
Dianella revoluta																			
Dichelachne micrantha																			
Dichelachne rara																			
Dichelachne sp.																			
Dichondra repens										+					1				
Dichopogon fimbriatus																			
Dillwynia sericea																	r	+	
Dodonaea viscosa											r		r				r		
Einadia nutans				r							r		+	r	1		r		
Eleocharis acuta																			
Elymus scaber													+						

Polygon ID	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79
Enneapogon nigricans	r								r						1				
Epilobium billardiereanum		r			+									r					
Eragrostis brownii	+				1														
Eragrostis trachycarpa																			
Eragrostis parviflora																			
Eragrostis sp.																			
Erodium crinitum														r					
Eryngium ovinum				r															
Eucalyptus blakelyi	+	+	2		r	2		2	1	1		1	2	+	+		2	2	
Eucalyptus bridgesiana												2	2	+	+	r			r
Eucalyptus dealbata																			
Eucalyptus dives								1			+								
Eucalyptus goniocalyx			1																
Eucalyptus macrorhyncha									+								+		
Eucalyptus mannifera											2							+	
Eucalyptus melliodora		2		2	r	2		3	r		2	1	2	+	1	+	+	2	
Eucalyptus nortonii																			
Eucalyptus polyanthemos																			
Eucalyptus radiata			1																
Eucalyptus rossii											2								
Eucalyptus rubida							r					2	2	+					
Eucalyptus viminalis																			
Eucalyptus sp.																		+	
Euchiton sp.	+	1	1	1	1	1	1	1	1	1	1		1	1	+	r		1	r
Euchiton sphaericus																			
Exocarpos cupressiformis											r						r	1	
Galium gaudichaudii																			
Gastrodia sp.																			
Geranium solanderi				r	+	+				+	r	1	1	1	+				
Geranium retrorsum																			
Geranium sp.																			
Glycine clandestina		r	r					r											
Glycine tabacina					+									r					
Glycine sp.																			
Gonocarpus tetragynus			1					1	1	+	1	1	1				1	2	
Goodenia hederacea			+								1						r	1	
Goodenia pinnatifida																			
Grevillea rosmarinifolia																			
Haloragis heterophylla					2	1	1		4	1			+		1	+		1	
Hardenbergia violacea																		r	
Hibbertia sp.																			
Hibbertia obtusifolia			+								r	r	+					+	
Hovea heterophylla																			
Hovea linearis																			
Hydrocotyle pedunculata																			
Hydrocotyle laxiflora		1	1	1		+		1	1	1	r	1	1	1	+			r	
Hypericum gramineum		1	1		+	+		1	1	+		1						1	
Indigofera australis								1											
Joycea pallida			1					+									+	1	
Juncus australis				+	+				r		r		+	r				+	
Juncus filicaulis																			
Juncus subsecundus																			
Juncus sp.	r					+				+							+		+
Kunzea ericoides													r						
Leucochrysum albicans var. *tricolor*																		1	
Lepidium sp.											r								
Lepidosperma laterale																			
Leptorhynchos squamatus				+					1	1									
Leptospermum sp.																			

Polygon ID	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79
Linum marginale																			
Lissanthe strigosa																			
Lomandra bracteata																			
Lomandra filiformis		r	+	r		r		r		+	1						1		
Lomandra filiformis subsp. *coriacea*	+			+		+		1	+		1	1	+					1	
Lomandra longifolia																			
Lomandra multiflora										r								r	r
Luzula densiflora			+	+															
Lythrum hyssopifolia					1	+	+		+	1				r	+				
Melichrus urceolatus			+	+				r	r								1	1	
Microlaena stipoides		3	2	2			+			1			1	3	2	1		1	+
Microtis unifolia			r						r							1			
Microtis sp.																			
Orchidaceae sp.																			
Opercularia hispida																			
Oxalis perennans				r	r		r			+	r	+	+		+		+	+	
Panicum effusum		r					1				1	+	1	1	+		+	+	
Pennisetum sp.																			
Persicaria prostrata					+														
Pimelea curviflora																			
Pimelea sp.																			
Plantago gaudichaudii																			
Plantago varia	+								+								+		
Poa labillardierei										+									
Poa sieberiana				+				1	1	+	+		1						
Poranthera microphylla			r								1								
Pratia pedunculata																			
Pterostylis sp.																			
Pultenaea microphylla																			
Pultenaea procumbens																			
Pseudognaphalium luteoalbum					r		r												
Rumex brownii		r		r	+		+		r		+	+		+	+	r	+		
Schoenus apogon		1	2		r	1	+	1	1	1	2	1	1					2	
Scleranthus biflorus																			
Scleranthus diander				r					r			r							
Scirpus sp.																			
Senecio quadridentatus											r								
Solenogyne dominii					r		+	+		1		1		1					
Stackhousia monogyna																			
Stellaria pungens								r			+								
Stypandra glauca											1							r	
Styphelia triflora											r								
Themeda australis			2	2		1		2	4			2	2	2	1		1	2	
Tripogon loliiformis																			
Tricoryne elatior									1	1			r					1	
Triptilodiscus pygmaeus			r																
Veronica calycina																			
Viola betonicifolia																			
Vittadinia cuneata																			
Vittadinia gracilis	+			r						r	1			r	+		+	+	
Vittadinia muelleri	+						1		1	1	+	1		+	r		2	2	
Wahlenbergia communis																			
Wahlenbergia gracilis											1								
Wahlenbergia stricta			r	+				r					r				1		
Wahlenbergia sp.	+	r				r	r			+		1		+	1			1	
Wurmbea dioica																			
Xerochrysum viscosum																			

Table E

Polygon ID	80	81	82	100	101	102	103	104	105	106	107	108	110	111	112	113	114	115
EXOTIC SPECIES																		
Acetosella vulgaris	1		1	+	+	1		1		+	1			1			1	
Aira cupaniana					+													
Aira sp.											+							
Anagallis arvensis				r	+	r		+		r					r	+		
Anthoxanthum odoratum																		
Arctotheca calendula				+							r							
Avena sp.																		
Briza maxima		1	1		+	r						r		2	1		1	1
Briza minor																		
Bromus. diandrus																		
Bromus hordeaceus																		
Bromus sp.				1														
Carthamus lanatus	r			+		r									r			
Centaurium sp.	1	1	1	+	+	r		+	+				+	1	+	+	1	
Chondrilla juncea		+		+													+	+
Citrullus sp.																		
Cirsium vulgare			+	1		r	r	+	r	+	+						+	
Conyza sp.				1	+		r	+	r	+							+	
Crataegus sp.		r																
Cynodon dactylon																		
Cynosurus echinatus		1	+		r	1									+	1		
Cyperus eragrostis				+				+										
Dactylis glomerata														1				
Dittrichia graveolens								r										
Dittrichia sp.			r															
Echium plantagineum				1										+				
Eleusine tristachya																		
Eleusine sp.																		
Eragrostis cilianensis																		
Eragrostis sp.																		
Erodium botrys	1																	
Erodium cicutarium																		
Erodium sp.																		
Gamochaeta americium																		
Hirschfeldia incana				+														
Holcus lanatus		1	1											1			r	
Hordeum sp.																		
Hypericum perforatum	+	r						+			r			+		+	+	
Hypericum sp.							+											
Hypochaeris glabra																		
Hypochaeris radicata	1		1	1	1	1	1	1	1	1	1			+		1	1	
Hypochaeris sp.																		
Juncus acutus														+			+	
Juncus sp.																		
Lactuca serriola				+						r	r							
Lepidium africanum																		
Linum trigynum					+			r								+		
Lolium perenne																		
Lolium rigidum																		
Malva parviflora																		
Marrubium vulgare																		
Medicago sp.																		
Modiola caroliniana				+							r							
Nassella neesiana																		
Nassella trichotoma			r	+			+		+					2	1	+	r	
Onopordum acanthium																		
Orobanche minor																		

Polygon ID	80	81	82	100	101	102	103	104	105	106	107	108	110	111	112	113	114	115
Paronychia brasiliana				1							r							
Paspalum dilatatum				2		1												
Petrorhagia nanteuilii		1		1		1		+	+	1	1	+						
Phalaris aquatica			1	2	1	1								4	2	1	+	1
Pinus radiata																		
Plantago lanceolata			1					2	1								+	
Polygonum aviculare								r										
Portulaca oleracea										r								
Rosa rubiginosa		r	+	+	+	+		+	r							1	r	r
Rubus fruticosus								r	r									
Rumex crispus																		
Salvia verbenaca																		
Setaria parviflora																		
Setaria sp.																	+	
Senecio sp.							r											
Silybum marianum																	r	
Silene gallica								r		r								
Solanum sp.																		
Solanum nigrum									r	+								
Sonchus sp.						r				r								
Sorghum sp.																		
Taraxacum officinale																		
Tolpis barbata					r													
Tolpis umbellata			r					r			r							
Tragopogon dubius																		
Trifolium angustifolium																		
Trifolium arvense								+										
Trifolium repens																		
Trifolium sp.	1	1	1	1		+				1				1	1	1	1	
Verbascum thapsus																		
Verbascum virgatum				+														
Vulpia sp.					+		r											
NATIVE SPECIES																		
Acacia baileyana											r	r						
Acacia buxifolia																		
Acacia dealbata				+	+	r		+	+									+
Acacia decurrens																		
Acacia gunnii							r	r										
Acacia implexa			r	1				+		+	+	1	1					+
Acacia mearnsii																		
Acacia pycnantha																		
Acacia parramattensis					1	+	1	r		+		1	1			+		
Acacia pravissima			r														r	
Acacia rubida																		
Acacia ulicifolia																		
Acaena echinata								1										
Acaena ovina		+	+	1	+		r		+	1			+		+			+
Acaena novae-zelandiae																		
Acaena sp.																		
Agrostis avenacea																		
Allocasuarina verticillata																		
Alternanthera denticulata																		
Alternanthera nana				r														
Alternanthera sp.																		
Amyema sp.			r					1		+								
Aristida ramosa	2	1	1		1		+		1	1	1	1	1				1	
Arthropodium sp.																		
Asplenium flabellifolium																		
Asperula scoparia																		
Asperula conferta				1		+		1										

Polygon ID	80	81	82	100	101	102	103	104	105	106	107	108	110	111	112	113	114	115
Astroloma humifusum					+													
Astrotricha ledifolia																		
Austrodanthonia caespitosa											1			1				
Austrodanthonia carphoides					2													
Austrodanthonia laevis				+														
Austrodanthonia racemosa																		
Austrodanthonia sp.	2	1	2				2	2	2	1		2			3		2	1
Austrostipa bigeniculata			1	2					+								2	2
Austrostipa densiflora		1	2				2			3	3	3						
Austrostipa mollis											r		r					
Austrostipa scabra	3	2		1			2	1	+	3	2	2	3				3	2
Billardiera sp.																		
Blechnum sp.																		
Bossiaea buxifolia																		
Bothriochloa macra	2	2	3	2	1	+	1	3	3	3	2	2	3	1	3	3	2	1
Brachyloma daphnoides	r											+						
Bracteantha viscosa																		
Burchardia umbellata																		
Bursaria spinosa sp. lasiophylla																		
Calocephalus citreus																		
Carex appressa		+																
Carex breviculmis				r	1	1					+						+	
Carex inversa				1				2			+						4	
Carex sp.												+		+				
Cassinia aculeata																		
Cassinia longifolia			r			r												
Cassinia quinquefaria				r						r	1	+	+				r	
Centipeda cunninghamii																		
Chamaesyce drummondii	r									+	+							
Cheilanthes austrotenuifolia	1		r								1	+						
Cheilanthes sieberi	r	1	+		1		+	1		+							r	
Chenopodium pumilio				+			r			r								
Chloris truncata				3						r	r							
Chrysocephalum apiculatum		1		+				+			r	1					+	
Chrysocephalum semipapposum		+															r	
Clematis microphylla																		
Convolvulus erubescens						r												
Cotula australis																		
Cryptandra amara		+									+							
Cymbonotus lawsonianus																		
Cymbonotus sp.	r			r	+		+	r			r							
Cymbopogon refractus												r						
Cynoglossum suaveolens																		
Cynoglossum sp.																		
Daviesia genistifolia												+						
Daucus glochidiatus																		
Desmodium varians		+				r		r	r	+		r						
Dianella longifolia																		
Dianella revoluta																		
Dichelachne micrantha																		
Dichelachne rara				r														
Dichelachne sp.													r					
Dichondra repens										+								
Dichopogon fimbriatus																		
Dillwynia sericea					+							+						
Dodonaea viscosa																		
Einadia nutans				1			1			+	1							
Eleocharis acuta																		
Elymus scaber	+			1	+	r	+											

Polygon ID	80	81	82	100	101	102	103	104	105	106	107	108	110	111	112	113	114	115
Enneapogon nigricans								+				1						
Epilobium billardiereanum				+		+		r		r								
Eragrostis brownii																		
Eragrostis trachycarpa				+														
Eragrostis parviflora																	1	
Eragrostis sp.						1		+				r	1	+				
Erodium crinitum																		
Eryngium ovinum																		
Eucalyptus blakelyi		r	2	1				2	3	2	2	2	2				2	1
Eucalyptus bridgesiana	+	+		2					+	1	+							
Eucalyptus dealbata												r						
Eucalyptus dives						+												
Eucalyptus goniocalyx					2	2	2									+		
Eucalyptus macrorhyncha	r	+			2		2									+	1	
Eucalyptus mannifera	+			2		r			r	r	+						1	1
Eucalyptus melliodora		r	2	1		1		2				+						
Eucalyptus nortonii																		
Eucalyptus polyanthemos																		
Eucalyptus radiata																		
Eucalyptus rossii						2	1											
Eucalyptus rubida									r								+	
Eucalyptus viminalis																		
Eucalyptus sp.					1													
Euchiton sp.	1	1	1	1	+	1	+	+	r				+	r	1	+	1	
Euchiton sphaericus																		
Exocarpos cupressiformis		r		+							r	+						
Galium gaudichaudii																		
Gastrodia sp.																		
Geranium solanderi				1	+	1		+	+		+							
Geranium retrorsum																		
Geranium sp.										+								
Glycine clandestina																		
Glycine tabacina																		
Glycine sp.																		
Gonocarpus tetragynus	1	1	1		+	1	1	r		1	1	1	1				+	
Goodenia hederacea	1				r		+	r			+	+					r	
Goodenia pinnatifida								r										
Grevillea rosmarinifolia				r														
Haloragis heterophylla				+	1	1		2					1		1	+	1	
Hardenbergia violacea																		
Hibbertia sp.																		
Hibbertia obtusifolia	r	+	+				r	+		r	+	1	1					
Hovea heterophylla												+						
Hovea linearis																		
Hydrocotyle pedunculata																		
Hydrocotyle laxiflora		1	+	1	1	1		1	1	1	1						+	
Hypericum gramineum	1	1	1		2	+		+						+		+	+	
Indigofera australis																		
Joycea pallida			+		1	+	1	+			1	1						
Juncus australis				r		r												
Juncus filicaulis																		
Juncus subsecundus				r		r					+					+	+	
Juncus sp.		+	+		+									+	1	+		
Kunzea ericoides																		
Leucochrysum albicans var. *tricolor*										r	r							
Lepidium sp.																		
Lepidosperma laterale												r						
Leptorhynchos squamatus																		
Leptospermum sp.	1																	

Polygon ID	80	81	82	100	101	102	103	104	105	106	107	108	110	111	112	113	114	115
Linum marginale						+												
Lissanthe strigosa																		
Lomandra bracteata																		
Lomandra filiformis			1	r	r		r			r								
Lomandra filiformis subsp. *coriacea*	1	1		r			1			r	+	1	1				1	+
Lomandra longifolia													r					
Lomandra multiflora	+																	
Luzula densiflora							r											
Lythrum hyssopifolia						+		+							+		+	
Melichrus urceolatus	+	1	1		+		r				r	1	1				+	
Microlaena stipoides				1	1	1	r			1				1	1		1	
Microtis unifolia		+																
Microtis sp.																		
Orchidaceae sp.																		
Opercularia hispida																		
Oxalis perennans	+			+	1		+			1	1		+		+			
Panicum effusum	1		1	1	2	2	+	3		+	+	+	2	1	2	2	2	
Pennisetum sp.																		
Persicaria prostrata				r				+										
Pimelea curviflora																	r	
Pimelea sp.					r													
Plantago gaudichaudii				r														
Plantago varia																		
Poa labillardierei			+	r	+													
Poa sieberiana		1				1	1											
Poranthera microphylla							+				r							
Pratia pedunculata					r			r										
Pterostylis sp.					+													
Pultenaea microphylla																		
Pultenaea procumbens																		
Pseudognaphalium luteoalbum																		
Rumex brownii	+			+		+		r		+					r	r		
Schoenus apogon		1	1					1				+					+	
Scleranthus biflorus																		
Scleranthus diander																		
Scirpus sp.												+						
Senecio quadridentatus					r								r					
Solenogyne dominii	+	1		r	r													
Stackhousia monogyna																		
Stellaria pungens					r		r											
Stypandra glauca											r		+					
Styphelia triflora																		
Themeda australis	2	2	2	2	3	3			2			2		+	+	3	3	3
Tripogon loliiformis													+					
Tricoryne elatior								r			r	r			r			
Triptilodiscus pygmaeus																		
Veronica calycina																		
Viola betonicifolia																		
Vittadinia cuneata					1													
Vittadinia gracilis	r							+									1	
Vittadinia muelleri		1		1	1			1	r	+	+	+	1			+	1	+
Wahlenbergia communis				1	1		+						+					
Wahlenbergia gracilis												+						
Wahlenbergia stricta						1		+	r		1	+						
Wahlenbergia sp.	r	1								+								
Wurmbea dioica																		
Xerochrysum viscosum										r	r	r	1					

Appendix B: Species Cover & Abundance Proforma

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Appendix C: Step Point Transect Proforma

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Appendix D: Vegetation Structure Proforma

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Appendix E: ACT Climax Vegetation Communities

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HEAD OFFICE
Suite 4, Level 1
2-4 Merton Street
Sutherland NSW
T 02 8536 8600
F 02 9542 5622

SYDNEY
Suite 604, Level 6
267 Castlereagh Street
Sydney NSW 2000
T 02 9993 0566
F 02 9993 0573

ST GEORGES BASIN
8/128 Island Point Road
St Georges Basin NSW 2540
T 02 4443 5555
F 02 4443 6655

CANBERRA
Level 4
11 London Circuit
Canberra ACT 2601
T 02 6103 0145
F 02 6103 0148

HUNTER
Suite 17, Level 4
19 Bolton Street
Newcastle NSW 2300
T 02 4910 0125
F 02 4910 0126

NAROOMA
5/20 Canty Street
Narooma NSW 2546
T 02 4476 1151
F 02 4476 1161

COFFS HARBOUR
35 Orlando Street
Coffs Harbour Jetty NSW 2450
T 02 6651 5484
F 02 6651 6890

ARMIDALE
92 Taylor Street
Armidale NSW 2350
T 02 8081 2681
F 02 6772 1279

BRISBANE
93 Boundary St
West End QLD 4101
T 0429 494 886

WESTERN AUSTRALIA
108 Stirling Street
Perth WA 6000
T 08 9227 1070
F 08 9227 1078