



ACT
Government

Superb Parrot Habitat Improvement Plan

A plan for the management, monitoring and improvement of
Superb Parrot, *Polytelis swainsonii*, habitat in the
Throsby-Goorooyaroo Nature reserve

Plan Implementation Team for the Gungahlin Strategic Assessment Biodiversity Plan

March 2015

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Version control

Revision	Revision date	Details	Authorisation Name/position
0.1	5 June 2014	Initial Draft	Michael Mulvaney, Conservation Planning and Research, Environment and Planning Directorate
1.0	21 October 2014	Submission to Commonwealth Department of the Environment	Dan Stewart/Deputy Director-General, Economic Development Directorate
2.0	March 2015	Submission to Commonwealth Department of the Environment	Dan Stewart/Deputy Director-General, Economic Development Directorate

Acknowledgments

The Plan Implementation Team would like to acknowledge the significant contribution to the development and production of this document by Michael Mulvaney and the research efforts of the Canberra Ornithologist Group (COG).

List of Abbreviations

ACT	Australian Capital Territory
APZ	Asset Protection Zone (includes both inner and outer APZ)
Box Gum Woodland	White Box - Yellow Box – Blakely’s Red Gum Grassy Woodland and Derived Native Grassland
CEMP	Construction Environment Management Plan (interchangeable with EMP)
CPR	Conservation Planning and Research unit (under EPD)
CMTEDD	Chief Minister, Treasury and Economic Development Directorate
DA	Development Application
DoE	Department of the Environment (Commonwealth) previously SEWPaC
ED	Economic Development (Part of CMTEDD)
EDP	Estate Development Plan
EIS	Environmental Impact Statement
EP Act	<i>Environment Protection Act 1997 (ACT)</i>
EPA	Environment Protection Agency
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999 (Cwth)</i>
EPIP Act	<i>Environment Protection (Impact of Proposals) Act 1974 (Cwth, repealed)</i>
EMP	Environment Management Plan (interchangeable with CEMP)
ESA	Emergency Services Authority
EPD	Environment and Planning Directorate (Previously Environment and Sustainable Development Directorate)
GSM	Golden Sun Moth <i>Synemon plana</i>
ILRP	Indicative Land Release Program
LDA	Land Development Agency (under CMTEDD)
LMA	Land Management Agreement
MNES	Matters of National Environmental Significance
NC Act	<i>Nature Conservation Act 1980 (ACT)</i>
NCA	National Capital Authority
NCP	National Capital Plan
NSW	New South Wales
OMP	Offset Management Plan (previously Reserve Management Plan)
PA	Preliminary Assessment
PALM Act	<i>Australian Capital Territory (Planning and Land Management) Act 1988 (Cwth)</i>
PCG	Project Control Group
PD Act	<i>Planning and Development Act 2007 (ACT)</i>
PDF	Planning and Design Framework
PIT	Plan Implementation Team
SBMP	Strategic Bushfire Management Plan (Version 3, 2014)
SEWPaC	Commonwealth Department of Sustainability, Environment, Water, Population and Communities (currently Commonwealth Department of the Environment)
SLL	Striped Legless Lizard <i>Delma impar</i>
TaMS	Territory and Municipal Services Directorate

General Introduction

The Gungahlin Strategic Assessment Biodiversity Plan (the Plan) commits the ACT Government to maintain and improve, Matters of National Environmental Significance (MNES) within set aside conservation areas. The relevant matters are:

- White Box - Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Box Gum Woodland),
- Golden Sun Moth, *Synemon plana* (GSM),
- Superb Parrot *Polytelis swainsonii* and
- Striped Legless Lizard, *Delma impar*.

The basic measures within the Plan to maintain and improve habitat include:

- Reservation of lands that support habitat for MNES that have previously been identified for urban purposes;
- increased investment in habitat enhancement beyond the minimum level required under the Territory's statutory obligation; and
- Increased investment in research targeted at the affected MNES and guided by action planning objectives.

Habitat Improvement plans have been prepared for each of the MNES. These plans:

- describe the current extent, condition and or population size of a particular value;
- outline what actions will be taken to seek improvement in condition, extent or population size;
- detail how improvements will be measured, monitored and reported;
- detail the research focus areas;
- contain commitments to adapt management depending on research results; and
- outline potential remedial actions should monitoring indicate a decline in a MNES matter

Over much of the offset areas, there is an overlap in the distribution of MNES values. Management favouring one particular value may not always be compatible with actions that enhance another value. For example, the condition of Box Gum Woodland can be improved by encouraging regeneration of sapling and tree growth, but this regrowth may be perceived by Superb Parrots as areas that may harbour predators and thus may not be conducive to successful Superb Parrot breeding.

The area identified in the Plan as containing known Superb Parrot habitat also contains some regenerating Box Gum Woodland and GSM habitat. Due to the limited area of known breeding habitat for the Superb Parrot, in the area of Throsby that will become part of the Goorooyaroo Nature Reserve, the habitat and ecological requirements of the Superb Parrot take precedent over other MNES.

While the plans outline and list the management actions that will be undertaken for particular MNES, details on how management actions will be implemented within the offsets area will be included within the Offset Management Plan (OMP) covering the area of Throsby East that is to be included in the Goorooyaroo Nature Reserve. This Habitat Improvement Plan will assist in guiding and informing the preparation of the OMPs.

Outcome commitments within the Plan relevant to Superb Parrot

The Plan and the supporting documents describe several long term outcomes from the commitments of the Plan. These are summarised below as outcomes and management strategies:

Outcomes

- Persistence of a breeding population in northern ACT in the long term;
- Improved management of potential habitat in order to support recovery of Superb Parrots;
- Improved understanding of habitat requirements for foraging and dispersing Superb Parrots within peri-urban and urban environments; and
- Improved understanding of the Superb Parrot population which occurs in the northern ACT in terms of, breeding requirements, nest site fidelity and breeding success.

Management strategies

- Prior to the construction of Throsby, commence management of additional 300 hectares to the Mulligan's Flat – Goorooyaroo nature reserve complex. This land is to be excised from the future urban area of Throsby and the 'Kenny Broadacre' area and managed for the protection of MNES;
- All known breeding locations within Gungahlin will be reserved and most are at least 100 metres from the edge of urban development. Some asset protection activities may occur within this buffer zone;
- Research and monitoring undertaken on the nesting, connectivity and foraging habitat requirements of the Superb Parrot population in the ACT, and how it reacts to nearby urban development. Research is likely to focus on nest site selection, nest site fidelity, fecundity, population dynamics and methods of reducing or eliminating nest hollow competition from aggressive native species or exotic pests such as common myna and European honeybee;
- Assisted natural regeneration that may eventually form hollow trees will be undertaken in areas likely to be suitable as future nesting sites;
- Protect known Superb Parrot nesting trees including exclusion fencing of the interface between Throsby East Reserve and the future urban area to limit pedestrian access points;
- Within development area, clearing outside breeding seasons of threatened bird species and fauna rescue procedures in place during clearing of hollow bearing trees;
- Placement of low intensity land uses in areas that might otherwise result in disturbance to species during critical life-cycle stages, e.g. Superb Parrot breeding;
- Control programs of ruderal species (identified pest species and those encouraged by urban development which are not usually a focus of control) such as of common myna and stray cats;
- Declaration of cat containment areas;
- Undertake plantings to improve connectivity and wildlife movement along Gungaderra and Sullivan's creeks, targeting Superb Parrot movement corridors in particular; and
- Removal of stock leading to a reduction in localised compaction and concentration of nutrients, improving long term tree survival.

Background

Distribution

The ACT is on the edge of the summer breeding range for this species, whose distribution is mainly to the west of the ACT. Before 2005 the species was regarded as a rare visitor in the ACT. In the summer of 2005–2006 an unprecedented number of superb parrots, including many dependent young, were recorded in north Belconnen (Lashko, 2006). Since then, increasing numbers have been reported from the northern suburbs of Canberra and the Gorooyarroo and Mulligan's Flat nature reserves. The rapid rise in the number of birds is evident in the garden bird sighting database (GBS) of the Canberra Ornithologists Group (Figure 1). Birds mainly move in from north-west of the ACT in early spring and depart late summer, but birds have been increasingly arriving earlier and departing later and in 2012 and 2013 it appears that birds may have overwintered in Canberra.

The reason for the increase in numbers and visiting time is uncertain. It may be due to:

- a real increase in the population size of the species,
- a larger proportion of the Superb Parrot population being attracted to the ACT to breed because of relatively favourable conditions compared to further west.
- a response to changing climatic conditions.

Recent survey on the South-west Slopes suggests a decline in numbers from what was previously recorded there about 10 years ago (Damon Oliver, NSW Department of Environment and Heritage – Personnel Communication).

ACT distribution

In the ACT the Superb Parrot has distinctive and separate breeding and foraging areas. Foraging largely occurs within suburban Belconnen and the Gungahlin suburb of Harrison. Birds are largely feeding on the seeds or flowers of planted trees and shrubs such as elms *Ulmus sp.*, Red Ironbark *Eucalyptus sideroxylon*, or wattles *Acacia sp.* or on grass seeds on suburban sports grounds. The observations of this bird by members of the Canberra Ornithologist Group provide a clear indication of the areas in which the majority of feeding occurs (see Table 1). There is no definitive estimate of the number of superb parrots within the ACT, but it is likely to be in the low hundreds (2013-2014 season).

Breeding in the ACT is confined to two areas, the Central Molonglo Valley and the Throsby Ridge area. This last location is within the Gungahlin Strategic Assessment area. It is thought that between 10 -20 pairs of Superb Parrots breed at each of the locations. There appears to be very little feeding activity at either breeding site. This could suggest that there are preferred feeding resources elsewhere and that as soon as young appear they leave the breeding area (Davey 2013b).

ACT Survey history and data

Surveys to locate Superb Parrot areas of activity and breeding have occurred across Gungahlin, and targeted the areas of Throsby, Kenny, Moncrieff, Kinlyside, Jacka, Taylor as well as parts of Mulligan's Flat and Gorooyarroo Nature reserves (Davey 2010, 2011, 2013a, 2014). As part of wider woodland bird research by the Australian National University, the presence of Superb Parrots has also been recorded during comprehensive and regular surveys of Mulligan's Flat and Gorooyarroo (Davey 2011).

During these surveys the location of any birds displaying breeding behaviour was recorded. Breeding activity can include any of the following:

- A reluctance by either sex to leave the vicinity of a tree with a suitable hollow nearby;
- female or male observed entering or leaving a hollow;

- copulation;
- aggressive interactions between pairs with a potential nest hollow nearby;
- a male ‘on station’ indicated by the presence of a lone bird perched quietly in a tree occasionally making a soft call with a possible nest hollow in the same or nearby tree; and
- The feeding by adult birds of young with very short tails and limited capacity of flight with a possible breeding hollow in the same or nearby tree.

The most frequently recorded breeding behaviour was of birds inspecting hollows or of males ‘on station’ indicated by the presence of a lone bird perched quietly in a tree occasionally making a soft call with a possible nest hollow in the same or nearby tree (Davey 2013b).

The location of all Gungahlin records of Superb Parrots and Superb Parrot breeding behaviour is shown in Figure 2.

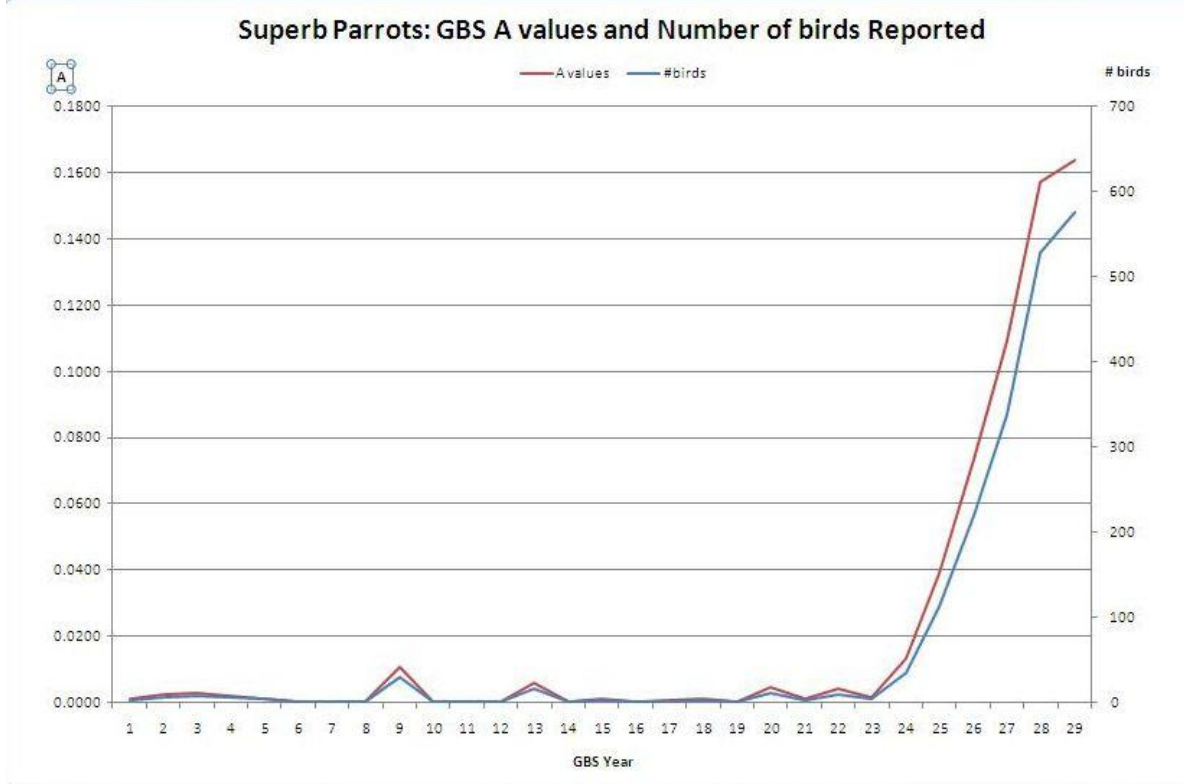
Over the 2009-2010, 2010-2011, 2012-2013 and 2013-2014 surveys, which either were across Gungahlin (first two surveys) or across the retained and reserved Mulligan’s Flat – Goorooyaroo area, breeding behaviour was observed on 105 occasions, 95 (90%) of these observations were on Throsby Ridge, five observations were in Throsby North retained area or adjacent area of Mulligan’s Flat and four observations were in the Throsby East retained area or Goorooyaroo nature reserve and one was a 2009 record of breeding at the now Harrison school site. There are also 4 other opportunistic sites of breeding behaviour in the Kenny (outside of the Strategic Assessment Area), Harrison or Throsby East areas observed in 2006, 2008 or 2009.

Nest selection

Across its range the superb parrot usually nests in hollow limbs or holes deep in the trunk of large woodland or riparian eucalypts, usually near a permanent water source. Preferred nesting trees are Blakely’s Red Gum (*Eucalyptus blakleyi*) or River Red Gum (*E. camaldulensis*).

It is not known why Superb Parrots chose to breed on Throsby Ridge. This ridge is dominated by *E. blakleyi*. There is a relative small area of old *E. rossii* (also known as Inland Scribbly Gum, Western Scribbly Gum, Snappy Gum or White Gum) and it would appear that breeding events are centred around these trees. Of the 24 possible sites recorded in 2012-13, 71% of these were in *E. rossii* and the presence of these old trees possibly with deep hollows may be an important reason for the location of this nesting site (Davey 2013b). This choice of trees is different to that observed elsewhere, including the Molonglo Valley where Blakely’s Red Gum is the main tree associated with breeding behaviour. The trees which have been recorded as suitable for breeding in Molonglo are large and very old and probably again contain deep hollows.

Figure 1 Sightings of superb parrots in Garden Bird Surveys by the Canberra Ornithologists Group (Butterfield 2011)



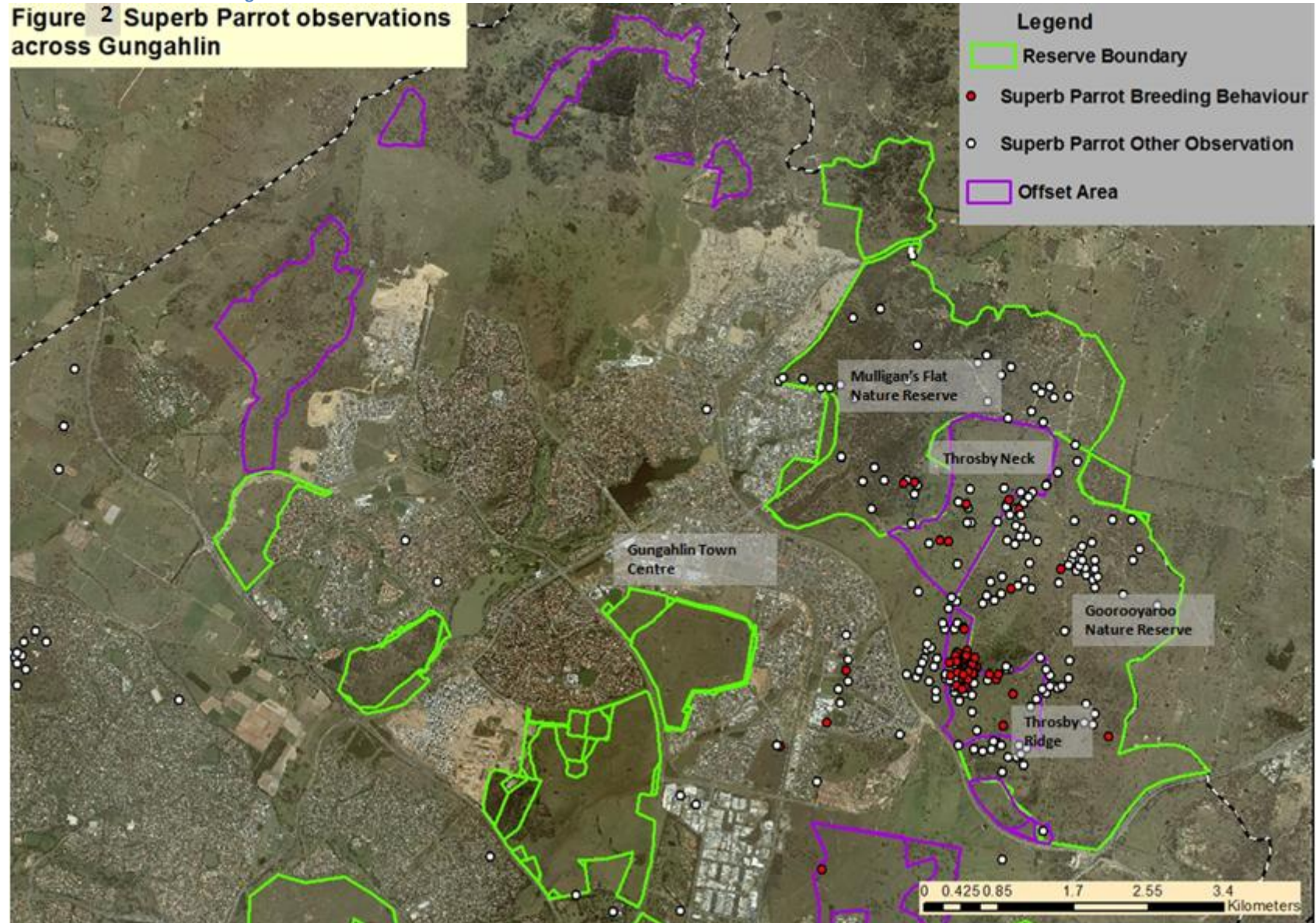
GBS year 20 = 2000/2001 GBS year 24 = 2004/2005, A value = average number of birds of a species recorded at a site for each week of the year. Note many birds are likely to have been recorded on multiple occasions.

Sightings of superb parrots in Garden Bird Surveys (Canberra Ornithologists Group), by location and suburb (Butterfield 2011) Suburban District (SSD)

Table 1 Sightings of Superb Parrots

SSD	Number of birds	Suburb	Number of birds
BELCONNEN	1151	PAGE	291
GUNGHALIN-HALL	98	COOK	274
KAMBAH	1	FRASER	125
NORTH CANBERRA	26	HARRISON	96
OTHER TUGGERANONG	5	ARANDA	92
WESTON CREEK	1	SCULLIN	87
WODEN	5		

Figure 2 Superb Parrot observations across Gungahlin



Foraging Habitat of the Superb Parrot

Foraging habitat is generally noted post breeding (mid-January) where parent birds and fledged young move away from the breeding habitat. In the ACT, Superb Parrots have been observed foraging in urban parks and reserves, and open spaces in establishments such as the Australian Institute of Sport, in Bruce, and Yerrabi Ponds, Gungahlin.

The Superb Parrot forages mainly on the ground for seeds of grasses and herbs but also feeds in the canopy and outer branches of shrubs. Further exploration of the foraging habitat for this species will be developed as part of the research program once breeding habitat has been confirmed through monitoring.

Movement of the Superb Parrot

Movement to the Throsby Ridge breeding area typically consists of birds flying in from the direction of Harrison, and then perching or chasing each other or interacting with other bird species and on occasions entering or defending tree hollows. In most cases, after a while the birds would then return to Harrison crossing Horse Park Drive (Davey 2014). On occasions birds would also depart Throsby Ridge and either veer off to the northwest and up into Throsby North (Throsby Neck) or into the direction of the large dam at Mulligan's Flat (Davey 2013b).

Birds may also fly out across Mulligan's Flat and Gorooyaroo reserves, while other birds may overfly these reserves heading into adjacent areas in NSW.

Garnett and Crowley (2000) observed that within NSW, Superb Parrots rarely cross open ground when moving from foraging to breeding grounds and tend to follow corridors containing trees. In the ACT the birds appear to consider Canberra's treed urban areas as providing sufficient protection from potential predators. It appears that the vegetation along Gungaderra Creek is an important link for foraging parrots moving from nest sites to feeding sites in Gungahlin and Belconnen.

Management actions to improve habitat

As the reasons why Superb Parrots are choosing to breed on Throsby Ridge are uncertain, management of this area will remain as it has been, that is light to moderate grazing with little human activity during breeding times. Likely reasons for the Superb Parrot to breed in this location are:

- Proximity to foraging areas of Box-Gum woodland;
- Proximity of urban foraging areas such as urban parks and playing fields; and
- Location and density of trees with suitable nesting hollows.

Management may change if research and monitoring suggest that it should. This will be in line with the requirements of the adaptive management strategy. Within the breeding area identified as the "intensive survey area" in Figure 7:

- All known trees where breeding behaviour has been recorded will be protected in an enduring way;
- Stock will be discouraged from camping under trees where known nesting sites occur (water points will not be located close to these trees). If compaction is resulting in tree die-back – then coring could be undertaken, if this is considered to improve soil compaction and/or the tree will be fenced with the ability to crash graze within the fenced area;

- Natural regeneration of some tree seedlings and protection of some saplings and existing trees will be maintained through fencing and/or targeted grazing to ensure a longer term availability of hollow bearing trees;
- Any fencing, weed control, feral animal control, fire management or other management activities undertaken by the Land Custodian (TAMS), within the Throsby Ridge Area (see Figure 2) will occur, where possible, outside of the September – to mid January breeding season; and
- If monitoring indicates that hollow shortage or competitive interaction with other species of hollow nesters is a matter of concern, then appropriate controls (such as trapping non-native species and other interventions to be determined by CPR, EPD) will occur outside of the Superb Parrot breeding season. Control techniques will be trialled and researched before applied to known breeding areas.

There will be a number of measures taken to restrict access by people and domestic animals to the breeding location and to minimise potential indirect impacts. These include:

- Declaration of Throsby and Kenny as cat containment suburbs;
- The urban edge will be 100m from the majority of trees in which breeding behaviour has been confirmed;
- Domestic animals will be restricted in relation the retained area consistent with the controls in place for Goorooyarroo Nature Reserve (no domestic animals permitted);
- The interface between Throsby and Goorooyarroo Nature Reserve will be fenced with at least stock proof fencing (sheep mesh), with mesh to deter animals from entering the area. Access for members of the public would only be permitted through formal access tracks which have been agreed during the Estate Development Plan process;
- An edge road (or similar design feature that will provide a urban edge buffer to the Nature Reserve boundary) will be provided ;
- Maintain large trees in line with the requirements of the *Tree Protection Act 2005* and through the EDP process; and
- Tree, sapling and shrub regrowth and will be encouraged in areas that are particularly important for woodland bird connectivity such as the Gungaderra Creek.

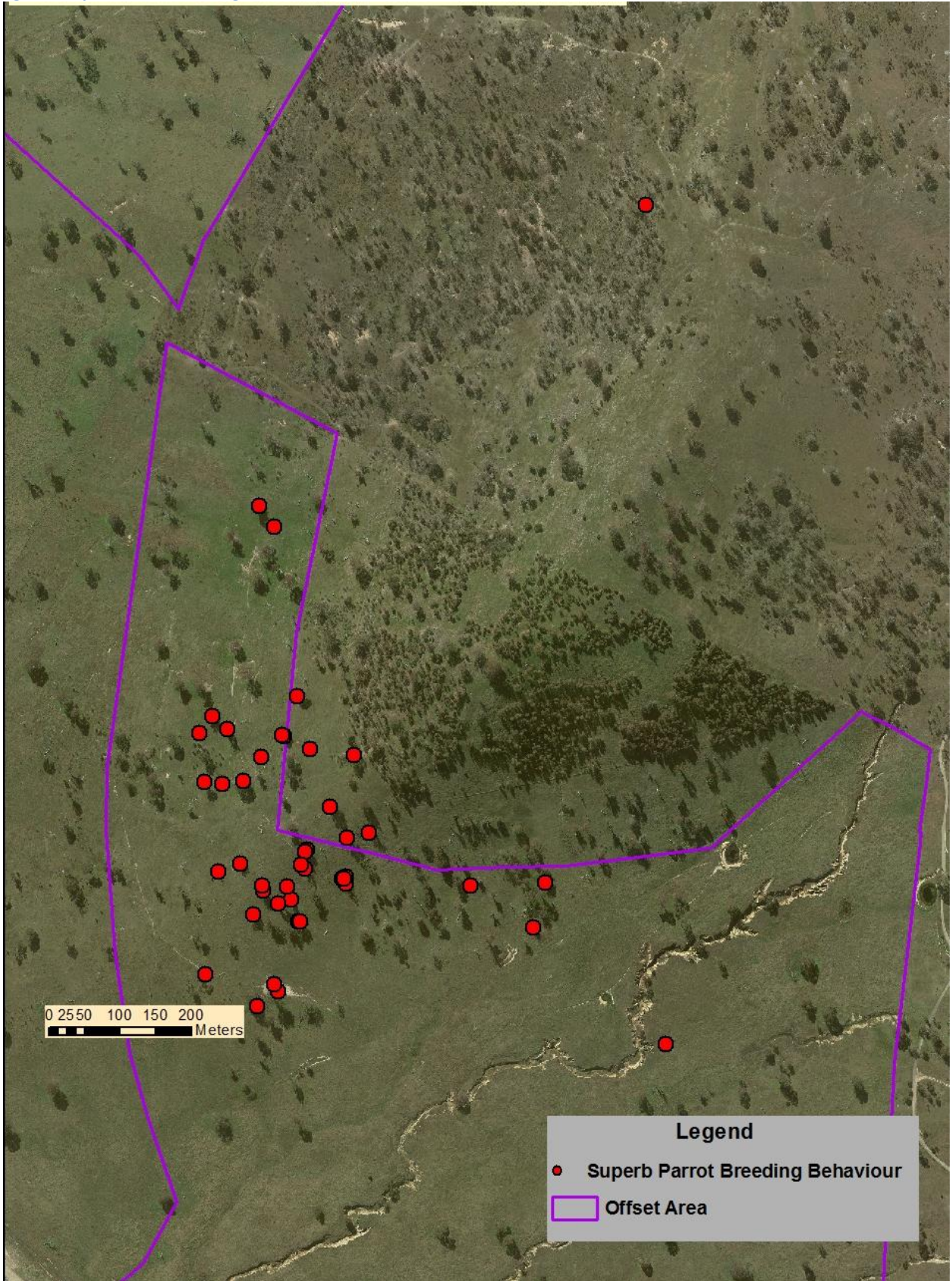
Research by Doer et al (2010) has found that most birds will move through a landscape provided there are patches of habitat at least 10ha in size and not more than 1.1km apart, provided there are trees or clumps of trees spaced no more than 100m between the patches. Figure 5 shows woodland patch sizes in the vicinity of Throsby Ridge. Areas shaded blue are already well connected to other trees, the darker the shade of blue the more the number of trees that are within 100m of each other. The orange –red shading shows the most effective links for moving across woodland in the ACT. Natural regeneration of woodland and supplementary planting will be occur in the least cost pathways, to ensure they meet the movement requirements determined by Doer et al (2010). This assisted natural regeneration should favour local Superb Parrot movement and provide, in the long-term, future additions to the tree hollow resource.

- Tree and/or shrub plantings aiming to have clumps of trees at least every 100m will occur along Gungaderra and Sullivan’s creeks, to assist in movement of Superb Parrots. Emphasis will be given to planting trees and shrubs on which the Superb Parrot is known to feed; and
- Large hollow bearing trees be retained within open space areas of Throsby in accordance with the *Tree Protection Act 2005* and the EPD. Appendix 2 is the draft Tree Management Plan for the Throsby EDP;

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- Local residents will be able to seek advice from the local Bush on the Boundary groups as well as other conservation volunteer groups on appropriate plant species for gardens and activities to support conservation activities in the nature reserves.

Figure 3 Superb Parrot breeding behaviour observation sites



Monitoring

Monitoring will continue in regards to key two features:

- a. The numbers of pairs of Superb Parrots displaying breeding behaviour within the Gungahlin Strategic Assessment area; and
- b. The competitive interaction that these birds have with other hollow nesting species.

A survey will also be undertaken in other potential breeding habitat areas within Molonglo Valley. This will be reported against in the Superb Parrot research documentation.

Foraging behaviour will not be monitored in the ACT due to the variables and distribution of observations of Superb Parrots. Key observations such as defined breeding behaviour, overwintering and significant flocks and interactions may be reported against where they occur outside the known breeding habitat.

If monitoring of competitive interactions indicates a trend of declining Superb Parrot breeding behaviour observations then methods of control will be researched, and applied where appropriate. These are described under “competitive interaction”.

Breeding activity

Surveys to monitor breeding activity will be undertaken every year for the first five years following development. If there is a stable (low fluctuations in recordings) or increasing breeding population in the Throsby Ridge area (see Figure 4) over the first five years from construction, monitoring of breeding activity within Throsby will occur every three years, until twenty years after construction, when the need for further monitoring will be reviewed.

The survey for breeding activity will:

- be undertaken in accordance with the Superb Parrot survey guidelines, see Appendix 1 (these guidelines may be updated from time to time);
- involve intensive survey over the Throsby area and extensive survey of the Mulligan’s Flat - Goorooyarroo area (see Figure 7);
- Survey methods may include:
 - survey of the Throsby area once in late September-early October, once in late October-early November and once in December. All eucalypt trees within the Throsby study area with diameter greater than 30cm will be inspected and any Superb Parrot sightings and breeding activity recorded, according to the categories described under Section 3. of this habitat improvement plan. The intensive survey of Throsby will involve a person walking in a zig zag fashion over the whole site for at least 3 hours;
 - Another method as accepted by CPR, EPD such as the draft method described by Umwelt Australia Pty Limited, September 2014; and
- at least twice between September and December, foot survey across the wider Mulligan’s Flat – Goorooyarroo area will be undertaken and any Superb Parrot sightings recorded. This will include whether a bird or group of birds is flying overhead, perched or displaying breeding behaviour. The flight direction of any Superb Parrot observed in flight will also be recorded.

Breeding activity was recorded during the seasons of 2012 and 2013, and will be recorded in 2014-2015, prior to construction. This will provide the benchmark for comparing breeding activity post Throsby construction. The 2012 and 2013 benchmark data is at Appendix 2.

Figure 4 Priority woodland regeneration areas

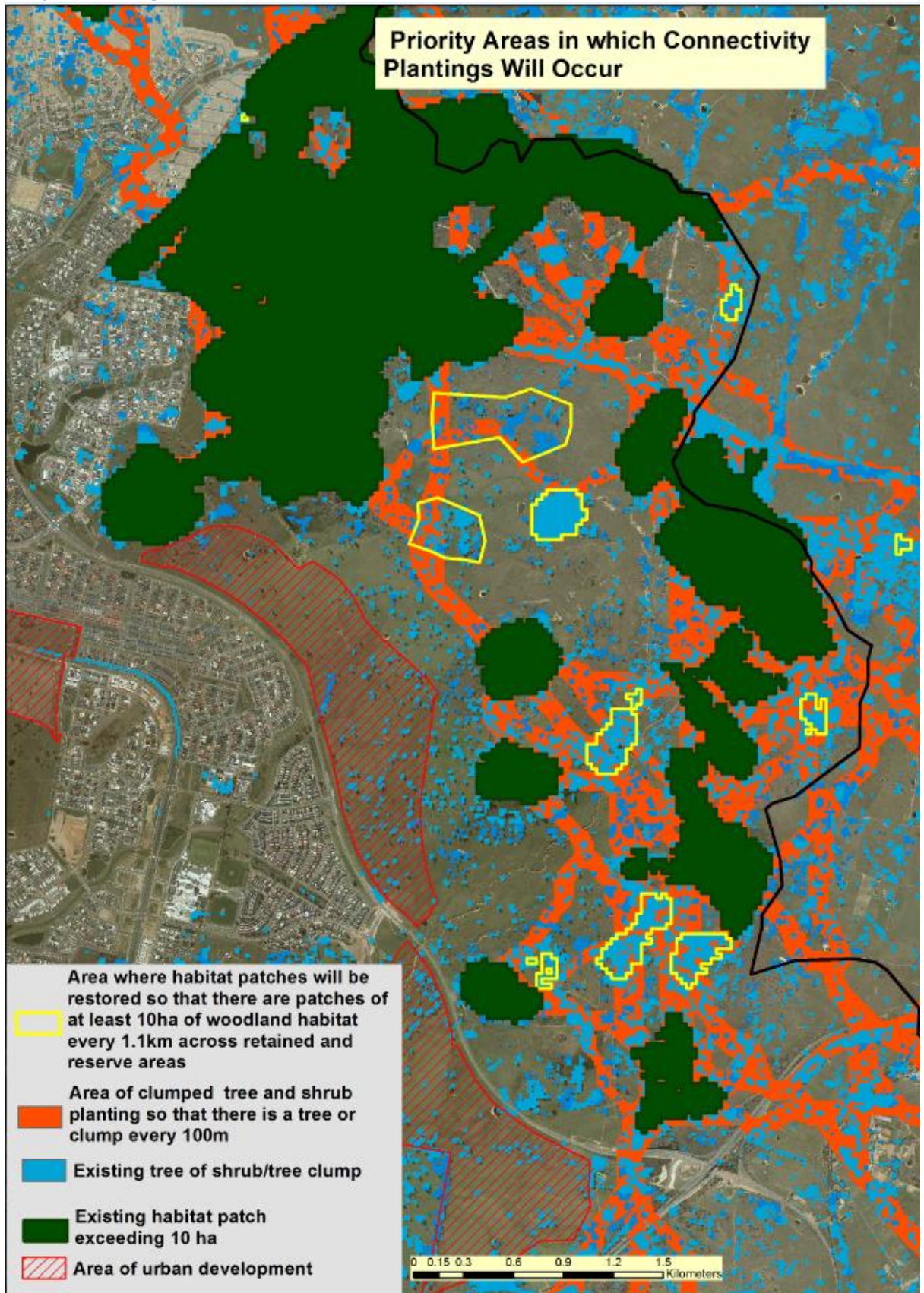
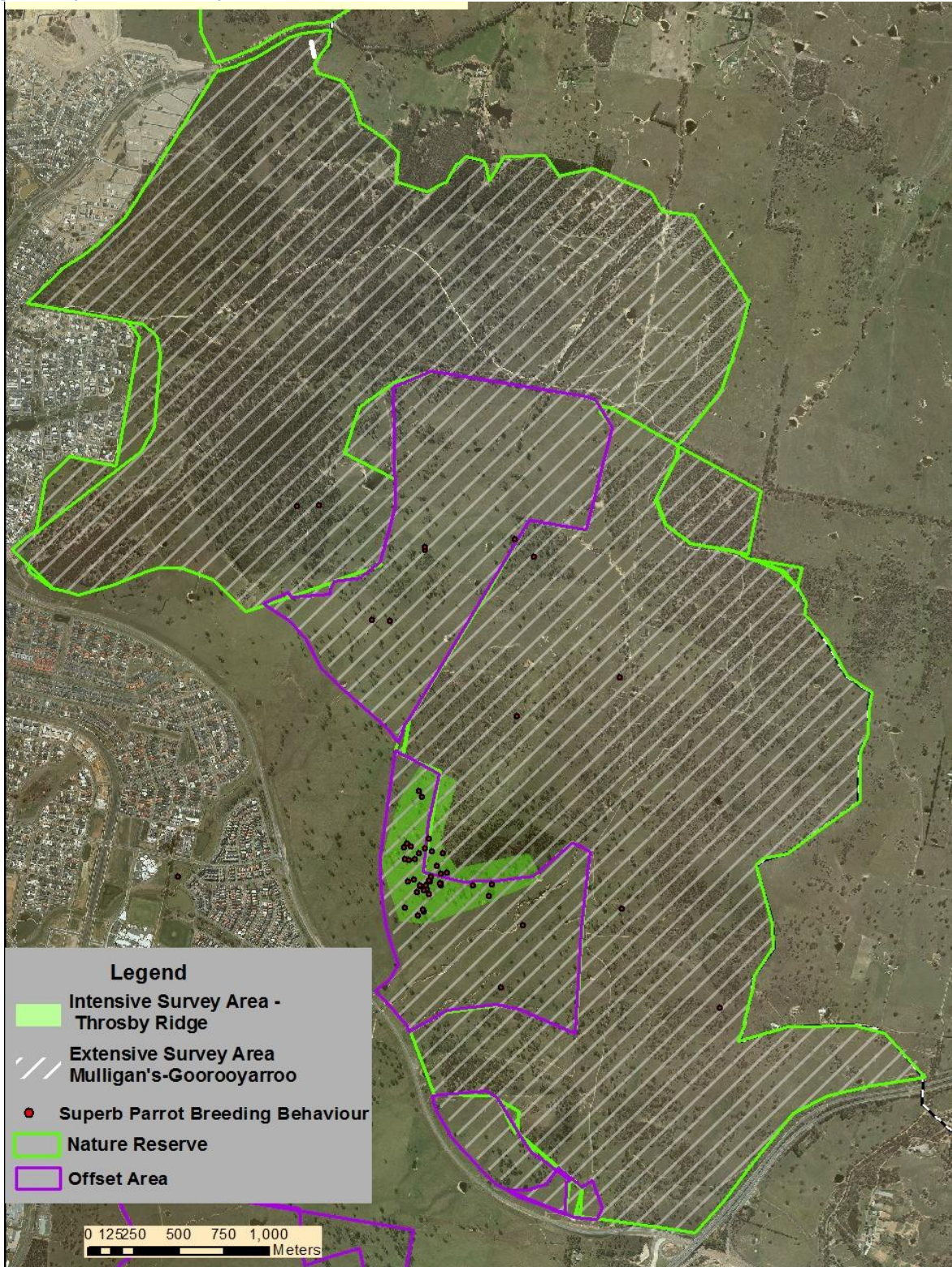


Figure 5 Superb Parrot survey sites



Competitive interaction

The successful breeding by Superb Parrots at Throsby Ridge is likely to be influenced by many factors including competition for nesting hollow resources, both within individuals of the same species and between species. The bird species recorded in the area that are most likely to compete directly with the Superb Parrot are:

- Galah *Eolophus roseicapilla*;
- Little Corella *Cacatua sanguinea*;
- Crimson Rosella *Platycercus elegans*;
- Eastern Rosella *Platycercus eximius*;
- Red-rumped Parrot *Psephotus haematonotus*; and
- Common Myna *Acridotheres tristis* .

Unlike the Superb Parrot the potential competitors remain resident in the Throsby area year round. It is possible that nearby urban development may through feeding or provision of foraging habitat increase local populations of competitors or by felling hollow bearing trees within the development area increase the level of competition in neighbouring areas, such as Throsby Ridge.

During the intensive surveys within the Throsby Ridge area a count will be undertaken of the number of breeding behaviours observed and the number of interactions between Superb Parrots and nesting competitors (Galah, Little Corella, Crimson Rosella, Eastern Rosella, Red-rumped Parrot and Common Myna). This data has been collected during the seasons of 2012 and 2013, and will again be recorded in 2014, prior to construction. This will provide the benchmark against which competitive interaction post Throsby construction activity can be compared. The 2012 and 2013 benchmark data is at Appendix 2.

If monitoring of competitive interactions indicate a trend of declining Superb Parrot breeding behaviour observations then methods of control will be considered. This could include:

- a. Disturbing competitive birds with noise or other measures when Superb Parrots are not recorded in the area;
- b. Encouraging local residents not to feed parrots through community education programs;
- c. Placing a bird of prey kite or a stuffed bird of prey in area when Superb Parrots are not recorded in the area; and
- d. Partial Putty filling of hollow entrances to exclude slightly larger competitors.

Research

The primary focus of funded research will be on understanding why Superb Parrots select particular breeding locations, nest site fidelity, fecundity and whether these are impacted by nearby urban development, and how management actions may improve the suitability of habitat and breeding success. This research will include consideration of impacts from tree hollow competitors and method to reduce stressful competition.

For the first three years approximately \$50,000 a year will be provided for Superb Parrot Research and monitoring. The Superb Parrot research projects will be designed once the initial research project (determining the survey method) has been completed and endorsed by the PIT.

The Canberra Ornithological Group and other community interest groups will also be encouraged to continue to play a role in the research and monitoring activities.

The initial research project includes the trial of a robust and repeatable survey method that aims to reduce the impact of surveyors on breeding and nesting birds. The project will be undertaken during the 2014 – 2015 breeding period and will be reported against in the 2014 – 2015 annual report. Additional details of this project will be reported in the annual report.

Monitoring and Research Costs

The first three years of monitoring would occur as part of the contribution to Superb Parrot research. It will be provided at \$17,500 (as a component of the \$50 000) per year for the first five years and \$17,500 every three years from then on, unless the research and monitoring indicates that Superb Parrot breeding within the area covered by the Plan is declining, and additional monitoring and research would be funded. The Plan Implementation Team may also consider that research work will be supported beyond the first three years from development beginning, even if the Superb Parrot breeding population is stable or increasing. These research and monitoring activities may change and be subject to review by the PIT. Table 2 describes the indicative breakdown of funding for Superb Parrot research and monitoring (including trials).

Table 2 Estimated funding requirements for Superb Parrot for the life of the Plan.

Year	Item	Cost (\$)
1	Superb Parrot Research projects Monitor known habitat area (Intensive survey area as per Figure 4) Monitor larger Throsby East (Extensive survey area as per Figure 4)	50 000
2	Superb Parrot Research projects Monitor known habitat area (Intensive survey area) Monitor larger Throsby East (Extensive survey area)	50 000
3	Superb Parrot Research projects Monitor all known locations of breeding activity	50 000
4	Monitoring of known nest sites as determined by outcomes of previous extensive survey	17 500
5	Monitoring of known nest sites as determined by outcomes of previous extensive survey	17 500
8	Monitoring of known nest sites as determined by outcomes of previous extensive survey	17 500
11	Monitoring of known nest sites as determined by outcomes of previous extensive survey	17 500
14	Monitoring of known nest sites as determined by outcomes of previous extensive survey	17 500
17	Monitoring of known nest sites as determined by outcomes of previous extensive survey	17 500
20	Monitoring of known nest sites as determined by outcomes of previous extensive survey	17 500
TOTAL		272 000

Research Collaboration

Monitoring programs and research, where relevant, will be presented to the research management group of the Mulligan’s Flat Woodland Sanctuary with the aim of fostering coordination and collaboration and avoiding any potential conflicts. A summary of research activities will be included in the Gungahlin Strategic Assessment annual report.

Corrective actions in relation to monitored population decline or changes

It is possible that a reaction to the nearby urban development may be that the 10 -20 pairs of Superb Parrots currently nesting at Throsby Ridge choose to nest in trees further away from the urban edge.

This could include nest sites and potential nest sites within the eastern section of Throsby Ridge, or other trees within the wider Mulligan's Flat – Gorooyarroo retained/reserved area. If there is a shift in breeding area, then the management commitments will apply to the changed breeding location(s).

If an increase in competitive interactions between Superb Parrots and other hollow nesters is observed and this or the pre-existing level of interaction appears to be impacting on the success of Superb Parrot breeding then actions (non – destructive) will be taken to reduce the number of competitive interactions.

If the number of pairs of Superb Parrots breeding at Throsby Ridge declines, then a series of adaptive management strategies will be applied:

1. Particular focus of the wider area monitoring will be to determine whether birds are breeding elsewhere in the Mulligan's Flat – Gorooyarroo area.
2. If a shift has not occurred then survey and collation of information will occur elsewhere in northern ACT to ascertain whether birds that used to breed at Throsby may now be breeding elsewhere in the ACT.
3. If birds stop breeding in the Strategic Assessment area, research will be undertaken as to what may have influenced the shift away or the change in breeding habits.
4. If birds stop breeding within the Strategic Assessment area, research will be undertaken as to how this breeding activity may be encouraged back to the location and how the persistence and viability of a breeding population of the Superb Parrot can be best maintained in northern ACT.

Management actions will be responsive to research findings. A condition of any funded research will be that the researcher relates their research findings to management guidelines.

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Appendix 1 – Survey Guidelines



Survey Guidelines for Superb Parrot

Conservation Planning and Research

September 2011

Purpose

These guidelines aim to promote a consistent and reliable method for determining the presence of Superb Parrots at sites in the ACT.

Aim

The aim is to determine whether or not the species is present at a site, which may also include determining whether breeding is occurring at the site.

Timing

Surveys should be undertaken during the period when Superb Parrots visit the ACT, which is in the spring/summer breeding season. Most birds will have arrived in the ACT by September and most will have departed by February, thus surveys should be undertaken between early September and late December. Surveys at each site should be repeated a minimum of 3 times with at least 3 weeks between surveys. It is desirable that the 3 surveys are spread across the breeding season, such as the first survey in late September, the second survey in late October or early November, and the last survey in December.

Methods

Surveys should be undertaken by observers who are experienced in bird surveys (or who are experienced 'bird watchers') and who are familiar with the species. Surveys may be conducted in teams (2 individuals per team) or as single individuals. Single observers and at least 1 member of a team should be familiar with the species' call. Surveys should be undertaken between 1 hour after sunrise and about mid-morning. Suitable survey methods include:

1. **Area Searches.** This method involves searching the survey site, or plots within the survey site, for a predetermined period of time. Area searches are typically conducted over plots of about 1–3 ha, for 10–20 min. Each plot is searched systematically, while stopping or moving to investigate sightings, calls or signs of presence. This method is considered to be more efficient for detecting Superb Parrots than the other methods.
2. **Transect Surveys.** This method involves recording birds that are seen or heard while travelling (usually walking) along a pre-determined transect. Transects may be straight

lines or follow curved paths such as along river edges. The length of transect(s) and number of transects within the survey site will depend on the size and shape of the site.

3. Point surveys. This method involves recording the birds detected at one or more locations. The sampling locations (points) are usually pre-determined and selected either randomly or systematically within the survey site. At each location the observer(s) wait for a pre-determined period of time (commonly between 5-20 min) and recorded all birds (or specific target species) heard or seen. Multiple locations should be far enough apart so that the chance of recording the same individual at more than one location is low.

Surveys should be undertaken in habitat that is suitable for the species (eucalypt woodland). All eucalypt trees within the study areas with a diameter greater than 30cm should be included in the survey and any breeding activity recorded.

Breeding activity can include any of the following:

- A reluctance by either sex to leave the vicinity of a tree with suitable hollow nearby;
- female or male observed entering or leaving a hollow;
- copulation;
- aggressive interactions between pairs with a potential nest hollow nearby;
- a male 'on station' indicated by the presence of a lone bird perched quietly in a tree occasionally making a soft call with a possible nest hollow in the same or nearby tree; and
- the feeding by adult birds of young with very short tails and limited capacity of flight with a possible breeding hollow in the same or nearby tree.

Appendix 2- Superb Parrot Observations

2012 -2013 Superb Parrot Breeding Behaviour. For ease of reading alternate trees listed are shaded

Date	Location		Easting	Northing	Tree type	Behaviour
1-Oct	55	H	697506	6103309	E. blakelyi	Pr hollow inspect
30-Nov						Fem out of hollow
11-Dec						Male on station
29-Nov	55	H	697422	6103299	E. blakelyi	Fem out of hollow
30-Nov						Fem on station
1-Oct	55	H	697471	6103237	E. rossii	Fem hollow inspect, defend area
3-Nov						Male on station
30-Nov						Fem into hollow
30-Nov	55	H	697451	6103200	E. blakelyi	Fem into hollow
11-Dec						Pr defend area
2-Oct	55	H	697665	6103112	E. rossii	Pr defend area
16-Oct						Male on station
3-Nov						Fem inspect hollow
14-Nov						Begging calls from hollow
30-Nov						Male on station
1-Oct	55	H	697622	6103080	E. rossii	Pr hollow inspect
16-Oct						Male feed fem
3-Nov						Fem inspect hollow
30-Oct	55	H	697593	6103078	E. rossii	Male on station
14-Nov						Male feeds fem
13-Dec						Fem hollow inspect, defend area
14-Nov	55	H	697549	6103093	E. rossii	Pr defend area
14-Nov						Male feeds fem
13-Dec						Fem hollow inspect, defend area
21-Dec						Pr defend area
2-Oct	55	H	697407	6103091	E. blakelyi	Male out of hollow
16-Oct						Male on station
13-Nov						Fem defend hollow
31-Oct	55	H	697540	6103058	E. rossii	Fem sit next to hollow
29-Nov						Fem into hollow
13-Dec						Pr defend area
21-Dec						Fem inspect hollow

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3-Jan						Pr look into hollow
13-Nov	55	H	697579	6103067	E. rossii	Fem defend hollow
21-Dec						Fem into hollow
1-Oct	55	H	697603	6103041	E. rossii	Fem hollow inspect
14-Nov						Inspect hollow
29-Nov	55	H	697470	6102970	E. rossii	Fem inspect hollow
13-Dec						Fem in/out hollow
1-Oct	55	H	697576	6103541	E. rossii	Pr hollow inspect
1-Oct	55	H	697519	6103427	E. rossii	Pr hollow inspect
1-Oct	55	H	697590	6103251	E. rossii	Pr hollow inspect
1-Oct	55	H	697564	6103039	E. rossii	Male feeds fem, fem into hollow
15-Oct	55	H	697496	6102928	E. rossii	Fem inspect hollow
15-Oct	55	H	697544	6103632	E. blakelyi	Fem inspect hollow + fem from hollow
31-Oct	55	H	697616	6103121	E. rossii	Male on station
14-Nov	55	H	697937	6103038	E. blakelyi	Inspect hollow
29-Nov	55	H	697614	6103145	E. rossii	Pr defend area
29-Nov	55	H	698145	6103041	E. blakelyi	Fem into hollow, male on station
21-Dec	55	H	697608	6103364	E. rossii	Fem inspect hollow

2013 -2014 Superb Parrot Breeding Behaviour

Date	Number	Location		Eastings	Northings	Tree type	Comments
7-Nov-13	1	55	H	697604	6103045	E. rossii	Territorial (# 2)
17-Dec-13	15	55	H	697606	6103045		Territorial
27-Nov-13	9	55	H	697666	6103105	E. rossii	(# 1)
28-Nov-13	14	55	H	697671	6103108		Leaving hollow
18-Dec-13	17	55	H	697668	6103105		On station
27-Nov-13	10	55	H	697614	6103143	E. rossii	Hollow inspect (# 7)
18-Dec-13	18	55	H	697614	6103143		Into hollow
7-Nov-13	2	55	H	697952	6103099	E. rossii	On station (#3)
27-Nov-13	3	55	H	697546	6102926	E. rossii	Hollow inspect (# 13)
27-Nov-13	4	55	H	697492	6103115	dead	Hollow inspect (# 11)
27-Nov-13	5	55	H	697479	6103334	E. rossii	Hollow inspect (# 22)
27-Nov-13	6	55	H	697472	6103242	E. rossii	Territorial (# 6)
27-Nov-13	7	55	H	697608	6103125	E. rossii	Hollow inspect (# 9)
27-Nov-13	8	55	H	697554	6103095	E. rossii	Hollow inspect (# 14)
27-Nov-13	11	55	H	697603	6103362	E. rossii	On station (# 17)
28-Nov-13	12	55	H	697403	6103228	E. blakelyi	Territorial (# 10)
28-Nov-13	13	55	H	697582	6103307	E. rossii	On station (# 16)
17-Dec-13	16	55	H	697682	6103280	E. rossii	Into hollow (# 18)
Date	Number	Location		Eastings	Northings	Tree type	Comments
21-Oct-13	19	55	H	697576	6103070	E. rossii	Hollow inspect (# 19)
21-Oct-13	23	55	H	697576	6103070		In/Out hollow
18-Nov-13	34	55	H	697589	6103094	E. rossi	Hollow inspect (# 20)
18-Nov-13	31	55	H	697576	6102884	E. rossii	Hollow inspect (# 21a/b)

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2012/2013 estimated number of Superb Parrots on each day of a survey period, estimated number of competitors on day of count of other species, total number of observed interactions between Superb Parrots and competitors, total number of competitor breeding observations and the total number of hours spent at Throsby Ridge. nc= no count.

	Superb Parrot	Little Corella	Galah	Crimson Rosella	Eastern Rosella	Red-rumped Parrot	Common Myna	Time (hours)
1/2 Oct								
Number	16-20	4	30	30	40	10	3	6.5
Interactions		0	0	7	1	0	0	
Breeding		1	4	8	15	5	0	
15-16 Oct								
Number	16-25	3	30	25	24	20	0	6.25
Interactions		0	0	0	0	0	0	
Breeding		2	3	17	13	4	0	
30-31 Oct								
Number	12-18	5	20	20	35	10	2	5.75
Interactions		0	0	0	1	0	0	
Breeding		2	3	13	13	4	2	
13-14 Nov								
Number	16-20	4	20	25	20	10	4	5.25
Interactions		1	0	3	4	0	0	
Breeding		0	3	5	6	1	1	
29-30 Nov								
Number	16-16	2	20	30	20	20	2	5.5
Interactions		0	0	5	0	0	0	
Breeding		1	1	7	7	2	1	
11-13 Dec								
Number	16-16	5	15	15	15	10	1	5.5
Interactions		0	1	5	1	0	0	
Breeding		2	0	11	4	2	1	
21-Dec								
Number	11	nc	nc	nc	nc	nc	nc	2.75
Interactions		0	0	4	0	0	0	
Breeding		nc	nc	nc	nc	nc	nc	
3-Jan								
Number	2	nc	nc	nc	nc	nc	nc	1.5
Interactions		nc	nc	nc	nc	nc	nc	
Breeding		nc	nc	nc	nc	nc	nc	

2013/2014 estimated number of Superb Parrots on each day of a survey period, estimated number of competitors on day of count of other species, total number of observed interactions between Superb Parrots and competitors, total number of competitor breeding observations and the total number of hours spent at Throsby Ridge. nc= no count.

TOTAL	Superb Parrot	Little Corella	Galah	Crimson Rosella	Eastern Rosella	Red-rumped Parrot	Common Myna	Time (hours)
16-Oct-13								
Number	17	3	11	43	24	14	9	5
Interactions		0	0	0	0	0	0	
Breeding		1	1	11	8	1	3	
7-Nov-13								
Number	48	2	33	42	42	13	3	5
Interactions		0	0	1	0	0	0	
Breeding		1	3	5	6	4	2	
27-Nov-13								
Number	38	4	29	44	49	25	8	5
Interactions		0	0	0	1	0	0	
Breeding		1	3	7	5	5	2	
28-Nov-13								
Number	28	n/a	n/a	n/a	n/a	n/a	n/a	5
Interactions		0	0	1	0	0	0	
Breeding		0	1	5	2	1	2	
17-Dec-13								
Number	20	n/a	n/a	n/a	n/a	n/a	n/a	5
Interactions		0	0	2	1	0	0	
Breeding		0	1	5	1	2	0	
18-Oct-13								
Number	22	1	16	18	14	3	4	5
Interactions		0	0	0	0	0	0	
Breeding		0	0	4	0	1	2	

