Ecological Management Plan for National Capital Authority Conservation Areas 2025 - 2035

Gurubang Dhawura (Stirling Park), Capital Hill, Guilfoyle St Grassland, Yarramundi Reach Grasslands and O'Malley Woodland.

DECEMBER 2025

Ecological Management Plan for National Capital Authority Conservation Areas - Gurubang Dhawura (Stirling Park), Capital Hill, Guilfoyle St Grassland, Yarramundi Reach Grasslands and O'Malley Woodland.

Prepared by Environmental Restoration Design and Planning on behalf of the National Capital Authority.

Acknowledgement of Country

We acknowledge the Traditional Owners of the land to which this Plan applies. We recognise and respect the enduring relationship they have with lands and waters, and we pay our respects to Elders past, present and future leaders.

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Disclaimer

Executive Summary

The National Capital Authority (NCA) engaged Environmental Restoration Design and Planning (ERDP) to review and update the 2016 Ecological Management Plan for NCA Grassland Conservation Areas which includes five grasslands and one grassy woodland site in central and southern Canberra managed by the NCA. These are:

Gurubang Dharuwa (Stirling Park) and Attunga Point.

- State Circle Woodland.
- Guilfoyle St Grassland Yarralumla ACT.
- Yarramundi Reach Grasslands, Acton ACT.
- O'Malley Woodland, Woden ACT.

This Plan updates the 2016 Plan as a reference document, but it also goes a lot further by providing detailed assessments of each of the five areas in their current state, and includes practical, on-ground focused recommendations to guide operations over the next ten years. It is designed to inform on-ground activities at the site level to enable planning for financial investment and prioritisation as well as stakeholder engagement activities.

The development of the new Plan involved visiting all the sites, and making recommendations based on site conditions (threats and values) and actions for ecological improvement. There have also been some new techniques for implementation of some aspects of the work such as seeding trials, ecological burning, and changes to mowing. In addition, a great deal progress has been made on strategic weed control, erosion control and the management of high conservation value areas by the NCA and stakeholders, and this has been recognised in this new Plan.

This Plan provides guidance for the next ten years within an adaptive framework. A 5 year review is advised, to assess works undertaken and ensure that the recommendations remain relevant. There are two parts to this Plan – the Ecological Plan, which provides background information, principles underpinning actions, context, maps and recommendations summaries, and an Annexure which provides detailed on-ground works advice for each site.

This Plan has been reviewed by the NCA Open Space and Planning Teams, Friends of the Grasslands (FOG) , and the Friends of ACT Trees.

Contents

1. Introduction

1.1 Purpose of the Plan

The National Capital Authority (NCA) engaged Environmental Restoration Design and Planning (ERDP) to review and update the 2016 Ecological Management Plan for NCA Grassland Conservation Areas (2016 Plan) which include five grasslands and one grassy woodland site in central and southern Canberra managed by the NCA. This document updates the 2016 Plan, but it also provides a new assessment of these important sites, and includes detailed practical, on-ground focused restoration. It is designed to inform on-ground management and planning for financial investment and prioritisation as well as stakeholder engagement activities. Note that this Plan does not seek to reiterate the contents of the 2016 Plan but rather to update key actions.

The five sites (shown in Figure 1) are as follows and all contain matters of national and territorial ecological significance:

- Gurubang Dharuwa (Stirling Park) including Attunga Point (Section 22 Block 4; Section 128, Blocks 2,3,10; Section 17, Blocks 4, 5,13,14,17, Yarralumla).
- State Circle Woodland (Section 2, Block 1 Capital Hill).
- Guilfoyle St Grassland (Section 66, Block 20, Yarralumla).
- Yarramundi Reach Grassland (Section 0 Blocks 1344 and 1339 Canberra Central).
- O'Malley Woodland (Section 4, Blocks 10-15 and Blocks 17- 22, O'Malley).

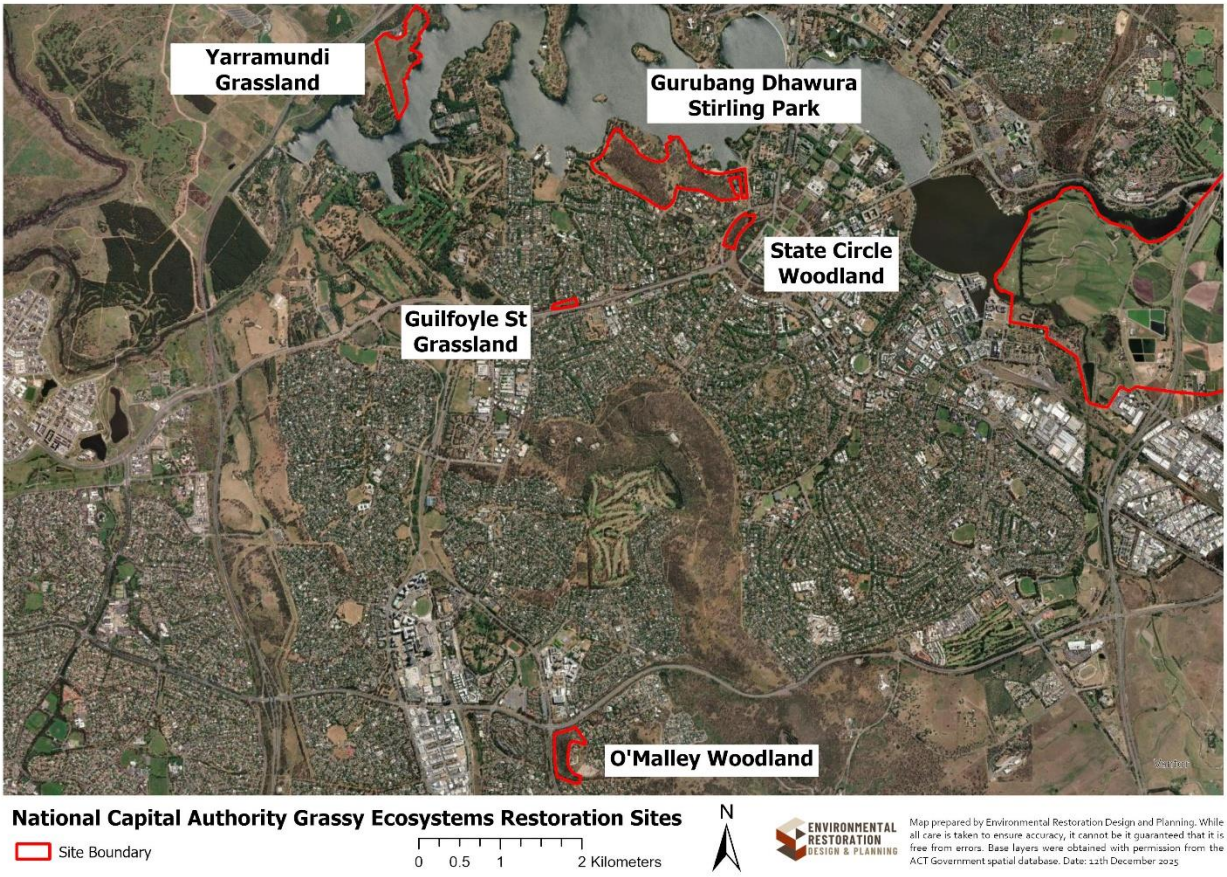

Figure 1. National Capital Authority Estate Conservation Areas, from the north: Yarramundi Grassland, Gurubang Dhawura (Stirling Park), State Circle Woodland, Guilfoyle St Grassland and O'Malley Woodland.

1.2 Methodology

This Plan builds on a previous ecological plan: Sharp S., 2016. *Ecological Management Plan for National Capital Authority Conservation Areas*. Report to the National Capital Authority, Canberra, April 2016, which outlines principles and other important underpinning ecological information. This Plan primarily focusses on specific on-ground actions within the context of existing documentation, although all relevant information has been captured. With reference to the 2016 Plan, site assessments were carried out at all five sites, and values, threats and recommended actions were determined with a view to improving ecological condition and conservation outcomes. Field information was mapped on a custom-built Field Maps application developed by geoAdapt. Relevant ACT Government data layers were also accessed with permission. Information collected in the field along with the ACT Government data layers were loaded onto ARCGIS Pro Desktop and used to create works implementation maps. The layers associated with these maps have been shared with the ACT Government to assist with implementation activities (information and tracking). Spatial information was used to create detailed site plans which bring together mapping and site-specific recommendations for on-ground works. This was then used to inform priorities, timing and estimations of costs.

Other important documents that were referenced include (but are not limited to) the National Capital Corporate Plan 2025-26 to 2028-29, the NCA Bushfire & Works Plan for National Capital Authority Estate – 2020-2022 which provides detailed plans for hazard reduction burning which is important to reference when implementing activities in this Plan, Invasive Plants Operational Plans, Pest Animal Management Strategy and a variety of Threatened Species Action Plans.

Some of these sites are also included within 'Lake Burley Griffin and Adjacent Lands', a place included on the Commonwealth Heritage List under the provisions of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). There are a range of cultural and natural heritage values that are protected under the EPBC Act listing that NCA is obliged to manage. The Lake Burley Griffin and Adjacent Lands Heritage Management Plan 2009 (HMP) contains policy guidance to manage the heritage values and should be referred to as part of on-ground works planning. All works will be subject to heritage approval in line with standard NCA processes.

1.3 Aims and Outcomes of the Plan

As mentioned above, the primary aim of this Plan is to comprehensively update the 2016 NCA Ecological Plan. Updates include changes in species composition and ecosystem condition, records of management actions taken in response to the original recommendations and policy changes in association with NCA activities and Matters of National Environmental Significance (MNES). The information in this Plan can be used to inform other planning documents and can help inform conservation management at these five sites. The Ecological Management Units used in the original document have been broken down into smaller discrete sites to assist with the prioritisation and on-ground delivery of the recommendations.

The recommendation sections for each NCA Grassland area have been separated into 'General Recommendations' which can be used to inform strategic planning, followed by site specific coded maps for restoration action and associated prioritised action tables.

2. Background

2.1 ACT and NCA Grassy Ecosystems

Prior to European settlement, the steeper hills with shallower soils at higher altitudes in the Canberra area largely supported Red Stringybark (*Eucalyptus macrorhyncha*) – Scribbly Gum (*E. rossii*) Tableland Forest. The moderate slopes and upper valleys were covered with Yellow Box (*E. melliodora*) – Blakely's Red Gum *(E. blakelyi*) Grassy Woodland, while Natural Temperate Grassland occupied the plains of the valley floors. Small areas of Drooping She Oak (*Allocasuarina verticillata*) Tableland Woodland and Broad-leaved Peppermint (*E. dives*) – Apple Box (*E. bridgesiana*) Tableland Woodland occupied some of the upper slopes. Ribbon Gum (*E. viminalis*) Tableland Riparian Woodland may have dominated some of the valley creek lines, while Snow Gum (*E. pauciflora*) – Candlebark (*E. rubida*) Tableland Woodland occurred on some of the lower land in the vicinity of the Natural Temperate Grassland (Eco Logical Australia 2011; Hogg and Nash 2011 cited by Mulvaney 2012). Since settlement, grazing and clearing, followed by urban expansion, have accelerated habitat fragmentation, erosion, and the spread of invasive species. Matters of National Environmental Significance (MNES) within the conservation areas include threatened species and ecological communities. These include:

- **Yellow Box—Red Gum Grassy Woodland** is classified as having White Box (*Eucalyptus albens*), Yellow Box (*E.melliodora*) and/or Blakely's Red Gum (*E.blakelyi*) as the most common current and past species with a predominantly native understorey. It is estimated that nationally less than 5% of this community remains in good condition (Sharp, 2016). Box-Gum Woodland occurs at Stirling Park and O'Malley Woodland: listed as a critically endangered ecological community under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and endangered under the ACT *Nature Conservation Act 2014* (NC Act).
- **Natural Temperate Grassland** (NTG) vegetation community is defined by its dominance of dense to open tussock grasses up to one metre tall, with a range of smaller grasses, forbs and graminoids (grass-like species such as sedges). Critically endangered NTG occurs at Yarramundi and Guilfoyle St and is listed under the EPBC Act (Natural Temperate Grasslands of the South-eastern Highlands, listed April 2016) and endangered under the NC Act.
- **Button Wrinklewort (*Rutidosis leptorrhynchoides*)** is found at Stirling Park (estimated 70,000 plants) and is listed as an endangered species under the EPBC Act and the NC Act.
- **Hoary Sunray (*Leucochrysum albicans tricolor*)** is found at Gurubang Dhawura – Blue Gum Point and is listed as endangered under the EPBC Act and the NC Act.
- **Golden Sun Moth (*Synemon plana*)** is found at Yarramundi Grassland and is listed as a critically endangered species under the EPBC Act and endangered under the NC Act.
- **Striped Legless Lizard (*Delma impar*)** is found at Yarramundi Grassland and is listed as vulnerable under the EPBC Act and the NC Act.
- **Superb Parrot (*Polytelis swainsonii*)** is found at Gurubang Dhawura – Blue Gum Point and is listed as Vulnerable under the EPBC Act and NC Act.

The following species are not MNES species but are important locally and listed under the Nature Conservation Act:

- **Perunga Grasshopper (*Perunga ochracea*)** is found at Yarramundi Grassland: listed as vulnerable under the NC Act.

It is important that these biodiversity and conservation values are maintained and improved. This can be achieved by protecting and connecting large patches of woodland and native grasslands and enhancing their function (Mulvaney 2012). Many grassy woodland areas across the ACT have been designated as Nature Reserves, but there are a number of grasslands outside the reserve estate, which need to be managed for their values, including NCA grasslands and grassy woodlands. Fortunately, NCA recognises these values and manage them accordingly in partnership with focus groups such as FOG and others.

2.2 Past Management Outcomes

Outcomes from past management efforts by NCA and interest groups such as FOG have resulted in improved ecological integrity of NCA nationally significant conservation areas. Through consistent and coordinated stewardship, these joint interventions have been instrumental in ensuring the survival and stability of key native grassland species, such as the endangered Button Wrinklewort which has expanded in its range. Notably, Gurubang Dharuwa has the largest population of Button Wrinklewort in the southern hemisphere! Without these sustained efforts, these species and grassy woodland ecosystems would likely have suffered further decline due to weed encroachment, habitat degradation and urban pressures.

NCA has achieved significant conservation milestones in collaboration with the FOG by delivering a structured, science-based conservation approach (along with significant investment) to ensure that threatened grassland ecosystems remain viable longer term. Achievements include:

- Developing and applying high-quality environmental management plans to guide site works, ensuring a consistent and well-informed approach to conservation.
- Adopting and implementing fire management plans, including active control burning, to enhance ecological function and manage grassland health.
- Conducting extensive woody weed removal, completing first-pass clearing at Gurubang Dhawura (Stirling Park), State Circle Woodland, and Yarramundi Reach, followed by ongoing ‘mop-up’ of emerging woody weeds to prevent regrowth.
- Regularly controlling key invasive weeds, including African Lovegrass (*Eragrostis curvula*), Blackberry (*Rubus anglocandicans*), Serrated Tussock (*Nasella trichotoma*), Chilean Needlegrass (*Nasella neesiana)*, and St John’s Wort (*Hypericum perforatum*), significantly reducing competition for native species.
- Removing exotic weeds along the Lake Burley Griffin shoreline, facilitating the successful control of Alligator weed (*Alternanthera philoxeroides*).
- Restoring degraded areas, including work at Gurubang Dhawuraand Yarramundi Grassland, to enhance and expand native BGW and NTG.
- Implementing a scrape-and-sow restoration trial at Yarramundi Grassland, a pioneering effort to regenerate native grassland ecosystems.
- Undertaking annual quantitative monitoring of vegetation condition at Yarramundi Grassland, ensuring ongoing assessment and adaptive management.
- Repairing fences to eliminate illegal vehicle access, preventing further disturbance to sensitive areas across multiple sites.

- Stabilising eroding tracks, improving site resilience and minimizing habitat loss.
- Installing conservation area interpretive signage at Gurubang Dhawura (Stirling Park), Yarramundi Grassland, and Yarramundi Reach, helping to educate visitors and promote awareness of the ecological importance of these sites.
- Engaging with Traditional Custodians to ensure conservation efforts align with cultural heritage protection and respect Indigenous values.

In addition to ecological and cultural outcomes, the partnership between NCA and FOG has delivered significant financial benefits by reducing the overall costs of environmental management. Volunteers contribute extensive hours and expertise, undertaking essential restoration and conservation works that would otherwise require substantial financial investment if undertaken by paid staff or contractors (or not undertaken to the same degree).

Going forward there is a desire by the community to formalise Gurubang Dhawuraand Yarramundi Grassland as designated nature reserves and if successful this would further support the work being carried out, ensuring legislative safeguards and the potential for additional funding. The feasibility of this is yet to be investigated, but these areas will continue to be managed as conservation areas .

2.3 General Recommendations

The following principles underpin recommendations throughout this Plan across all sites.

2.3.1 Collaborative Management

To deliver the best outcomes for each site, it is important that stakeholder groups work collaboratively with land managers and delivery activities work towards achieving the same outcomes. Communication and documentation of on-ground works are paramount to ensure decisions can be effectively made in an adaptive management framework. This Plan should ideally be reviewed every 5 years with input from stakeholders.

2.3.2 Best Practice Fire Management

Bushfire Operations Plan (BOP) are available for each site through ACTMapi. BOPs outline the prescribed burning, slashing and chemical herbicide application, with outcomes designed to achieve ecological and/or fire mitigation objectives. Also refer to the Bushfire & Works Plan for National Capital Authority Estate – 2020-22 and management guidelines for threatened species and communities if they occur in planned burn areas.

Fire can be used to manage weeds and facilitate regeneration. Optimal fire frequency and intensity must be considered for the woodland / grassland type and any threatened flora or fauna species. Due to the high populations of Button Wrinklewort (particularly in Gurubang Dhawuraand on Capital Hill, special care must be taken if using burning for biomass management (Sharp 2016). General principles include:

- Burn between April and November to avoid summer flowering and fruiting season.
- Burns must be patchy and low intensity.
- No ground disturbance should occur within 50m of known colonies.
- Exercise caution when using chemical for weed control within Button Wrinklewort habitat. Avoid Physical damage to plants.

In many cases, burning can be used to manage habitat for threatened species and communities where high biomass reduces habitat suitability. This is often used in conjunction with other methods such as slashing and grazing. Optimal timing for burning and other biomass management techniques is shown in **Figure 2**. Note that stock in this table refers to domestic livestock which are not present in any of the NCA conservation areas, however herbivore grazing by kangaroos and rabbits does result in in reduced biomass in some areas.

2.3.3 Build on Natural Values and Maximise Complexity

Compromised native ecosystems have a strong ability to recover. In the first instance, an assessment needs to be made to determine the capacity of nature within the area to regenerate before looking to intervene. Often, management of threats is all that is required. The Society of Ecological Restoration provides principles and standards for restoration. A downloadable pdf with context and instructions can be found here: International principles and standards for the practice of ecological restoration. Second edition.

Investment in the highest conservation value areas is the highest priority to prevent these areas from becoming degraded, however connectivity between high value areas is also important. This does not preclude works in more degraded areas, but it should not be undertaken at the expense of protecting high value areas. The exception to this is where the threat of degradation is

	Grassy Layer Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Fire	Native C3 Components	NE	NE	CN	CN	UN	UN	UN	UN	CN	CN	CN	UN
	Native C4 Components	CN	BE	BE	BE	CN	CN	UN	UN	UN	CN	CN	UN
Slashing	Native C3 Components	UN	UN	UN	UN	BE	BE	UN	UN	CN	CN	CN	NE
	Native C4 Components	UN	UN	UN	UN	BE	BE	UN	UN	CN	CN	CN	NE
Stock	Native C3 Components	BE	BE	BE	BE	BE	UN	CN	CN	CN	CN	NE	NE
	Native C4 Components	NE	NE	BE	BE	BE	UN	CN	CN	CN	CN	NE	NE

	Conservation Value	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Fire	Natural Temperate Grassland	CN	CN	BE	BE	CN	CN	UN	UN	UN	CN	CN	CN
	Box-gum woodland	NE	NE	BE	BE	BE	UN	UN	UN	CN	CN	CN	NE
	Golden Sun Moth	UN	UN	CN	CN	CN	UN	UN	UN	UN	CN	CN	CN
	Striped Legless Lizard	CN	CN	BE	BE	UN	UN	UN	UN	UN	CN	CN	CN
	Pink-tailed Worm-lizard	OK	OK	UN	UN	OK	OK	OK	NE	NE	NE	CN	OK
	Grassland Earless Dragon	UN	UN	CN	CN	CN	UN	UN	UN	UN	CN	CN	UN
	Superb parot	UN	UN	UN	UN	OK	OK	OK	UN	CN	NE	CN	NE
Slashing	Natural Temperate Grassland	UN	UN	UN	UN	BE	BE	UN	UN	UN	UN	CN	BE
	Box-gum woodland	UN	UN	UN	UN	BE	BE	UN	UN	UN	UN	CN	BE
	Golden Sun Moth	CN	CN	UN	UN	CN	CN	CN	UN	BE	BE	NE	NE
	Striped Legless Lizard	UN	UN	UN	UN	UN	UN	UN	UN	UN	UN	UN	UN
	Pink-tailed Worm-lizard	OK	OK	UN	UN	OK	OK	OK	NE	NE	NE	CN	OK
	Grassland Earless Dragon	UN	UN	UN	UN	UN	UN	UN	UN	UN	UN	UN	UN
	Superb parot	UN	UN	UN	UN	OK	OK	OK	UN	CN	NE	CN	NE
Stock	Natural Temperate Grassland	NE	NE	BE	BE	BE	CN	CN	CN	CN	CN	NE	NE
	Box-gum woodland	NE	NE	BE	BE	BE	CN	CN	CN	CN	CN	NE	NE
	Golden Sun Moth	OK	OK	OK	OK	OK	CN	CN	CN	OK	NE	NE	OK
	Striped Legless Lizard	OK	OK	OK	OK	OK	CN	CN	CN	OK	OK	OK	OK
	Pink-tailed Worm-lizard	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Grassland Earless Dragon	NE	NE	OK	OK	OK	CN	CN	CN	OK	OK	NE	OK
	Superb parot	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK

KEY	
Action likely to have a benefit	BE
Action may have a benefit but consideration needed.	CN
Action likely to have a negative impact	NE
Action unlikely to impact	OK
Impact unknown	UN

Figure 2. Management Timing for Threatened Species (Provided by ACT Government, 2020)

impacting on high value areas e.g. point source erosion polluting good areas downstream, degraded areas adjacent to high value areas.

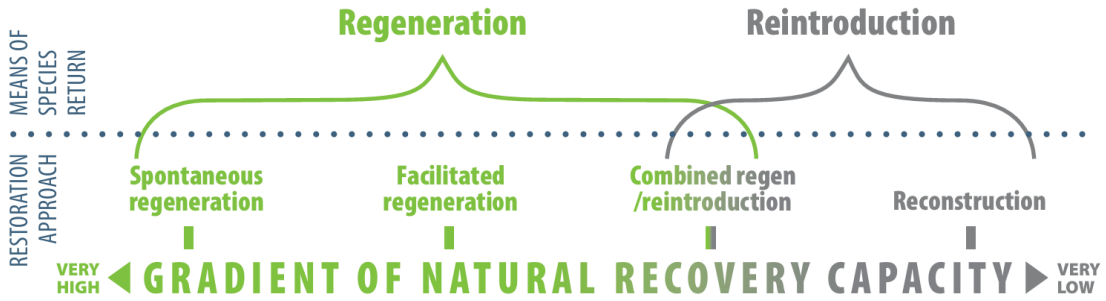

Figure 3. Schematic diagram of four restoration approaches that align with the degree of natural regeneration potential present at a degraded site at any scale, from individual organism to whole of ecosystem. The NCA Grassland areas span the entire continuum, often in a single site, which further enforces the need to be efficient and effective with interventions to improve ecological condition. Source: Society For Ecological Restoration Standards Edition 2.2 2021.

Complexity is the key to healthy functioning ecosystems. 'Messy' is best practice even though it is often tempting to 'clean up' woody debris and dead vegetation, particularly in high use visitor areas and agricultural landscapes. It is important to maintain habitat diversity, including fallen timber, hollows, rocks and vegetative structural diversity.

2.3.4 Prioritise Weeds as a Key Threat to Healthy Diverse Ecosystems

Weeds are specifically mentioned here as they are one of the biggest threats to healthy ecosystem function, as they displace native vegetation and often result in monocultures when left unmanaged. However, as there are over 685 species of weeds in the ACT, eradication will never be achieved and therefore weeds, and other exotic plants, need to be prioritised and managed according to their 'actual' versus 'perceived' threat to biodiversity. In conservation management, the terms 'weeds' and 'invasive plants' denote two different concepts. Weeds are plants growing where they are not wanted. In contrast, invasive plants are alien plants whose introduction and/or spread threatens biological diversity (Convention on Biological Diversity & IUCN). Invasive plants can also impact socioeconomic activity.

Invasive plants are usually competitors to native vegetation. Around 10% of invasive plants are transformer weeds, so-called because they have the potential to cause substantial ecosystem-wide impacts. There are different categories of transformers including: excessive users of resources, donors of limiting resources, fire promoters/suppressors, erosion promoters, sand/sediment accumulators, litter accumulators and salt accumulators/redistributors (ACT Government 2020). Examples of transformers include Serrated Tussock, African Lovegrass, Chilean Needle Grass, St John's Wort and most woody weeds in grasslands such as Cootamundra Wattle, Cotoneaster and Blackberry as they change light availability and soil conditions. Other problematic plants at grassland sites are Paspalum and Tall Fescue as they significantly reduce diversity.

Many weed monitoring programs tend to measure a reduction in weed burden rather than improvement in biodiversity. Resources should be prioritised to ensure the best outcomes for biodiversity. Prioritising weed control needs to assess longer term outcomes, including which

plants are likely to recolonise once weed control has been carried out. Consideration should be given to whether there is a sufficient seedbank of native plants to recolonise soil once weeds have been controlled. There may even need for acceptance that some sites will remain colonised with low priority weeds (known as 'competitive ruderals', or plants that colonise disturbed areas such as Thistle, Mustard Weed and Fleabane).

Some locally native species can also become invasive in some settings, especially primary colonisers such as *Kunzea, Cassinia* and some Acacias. These should be used with care in revegetation programs. Although native, they respond to changes in the landscape such as overstorey clearing, which favours their dominance. This is because they are natural colonisers and are one of the first stages of vegetation returning to forest ecosystems by fixing nitrogen and improving soil health.

The following questions should be asked when planning weed control:

- What is the purpose of the weed control?
- What are the long-term outcomes for biodiversity if the weed is controlled or not controlled?
- What is the threat of a particular weed to high conservation value areas now or in future?
- What plants are going to recolonise once weed control has been carried out?
- Is there a suitable native plant seed source in the area to replace weeds or are other weeds going to replace those controlled?
- Does active revegetation need to occur (planting or seeding)?
- What is the best method of control for longer term benefits and to minimise off target effects e.g. spraying, slashing, burning, mulching, hand pulling, and what are the likely long-term outcomes of each of these?
- What is the cost: benefit ratio of controlling any particular weed?

2.3.5 Landscape Connectivity

The creation of corridors between patches of existing vegetation to enable species to move between them is an important goal for habitat restoration and enhancement. Use the 150m/1.0 to 1.3km/10ha optimal rule (CSIRO 2014). That is, the distance between revegetation stepping-stones should be no more than 150m, the distance between patches of remnant vegetation being connected should be no more than 1 - 1.3km apart and the size of these remnant patches no less than 10ha.

Focal species for connectivity include grassland reptiles in grasslands, woodland birds and mammals in woodlands and insect pollinators across the landscape more broadly. Mobile species, such as birds and pollinator insects, can move across the landscape relatively easily. Grassland reptile movement however is hindered by significant barriers such as roads, unsympathetic mowing activities and to a lesser extent bike paths. These should be taken into account when planning activities, even if they can't be immediately addressed.

In addition , in urban open space areas there is also a focus on implementing multi-beneficial actions relating to visitor use, amenity and maintenance; as a result there are a number of potential constraints in relation to fire management, urban landscape design, safety and access.

The priorities for NCA conservation areas are to a) restore grassy understory connectivity east-west to better link the three major patches of Box Gum Woodland, and north to Attunga point, and b) to restore contiguous grasslands across the site at Yarramundi Reach by improving areas dominated by grassy weeds.

2.3.6 Undertake Monitoring and Evaluation of Works

There have been considerable monitoring activities undertaken by FOG over the past almost two decades. These can be found in Attachment A of the 2016 Ecological Management Plan (Sharp 2016). One of the key overarching recommendations is to continue and collate this monitoring effort to ascertain changes to the sites where monitoring has been undertaken. In other sites, it is recommended that photo monitoring (at the very least) is set up.

Monitoring on-ground works is paramount to gain an understanding of the effects of actions (either in isolation or combined) and whether these actions are achieving the desired outcomes. There are resources that provide step-by-step guidance for establishing formal monitoring sites, such as Vegwatch, and specifically designed monitoring programs can be developed in consultation with experts. At Gurubang Dhawuraand Yarramundi Reach, monitoring has been conducted over several years, providing valuable insights into vegetation change and the effectiveness of restoration efforts. Existing data from these monitoring efforts should be referenced and made accessible to inform ongoing and future management decisions.

Grassland restoration works are commonly monitored by groundcover surveys in set areas (usually 1m x 1m quadrats at 5m intervals along a 50m transect or 100 steps). The location of transects is particularly important for assessing changes in groundcover composition over time, ensuring that trends in vegetation response can be accurately measured.

However, one of the easiest monitoring techniques is setting up photo monitoring points at desired locations. This can be undertaken by installing posts, or by including landmarks in the background that are unlikely to change (such as hills or trees). GPS locations should be recorded for all photo monitoring points. Generally, photo monitoring is undertaken by the photography rule of thirds, where one third of the photo is foreground, one third is middle ground and one third of the photo captures the far distance. There is now an application available for iPhones called ‘Context Cam’. This imprints locations on each photos and stores the photo for future repeat efforts. Monitoring does not need to be complicated but is critical in evaluating the success of works and needs to be properly planned during the initial stages of works implementation.

3. Site Specific Recommendations

3.1 Gurubang Dhawura (Stirling Park), Yarralumla

Gurubang Dhawura is a large 52ha woodland located between Alexandrina Drive, Empire Circuit and Fitzgerald Street in Yarralumla. Stirling Park includes patches of Natural Temperate Grassland and populations of threatened species. Figure 4 shows the location of Stirling Park.

Figure 4. Location and extent of Gurubang Dhawura– NCA managed land.

3.1.1 Land Use History

Gurubang Dhawura is located on the traditional lands of the Ngunnawal people and holds cultural significance as a traditional pathway connecting nearby Black Mountain and Capital Hill. The area is recognised as an important meeting place for neighbouring Aboriginal groups, valued for its use as a campsite and for ceremonial purposes. It was once a prominent gathering site, which underscores its importance as a hub which supported large gatherings for cultural exchange and community connections. The park is home to numerous artifacts and sacred sites, including Bullan Mura, an important women's site, which is actively in use for traditional practices and ceremonies today.

During the early 1920s, Gurubang Dhawura was occupied by European workers as a temporary settlement to house those involved in the construction of Canberra. Named Westlake, it was one of the largest workers' camps in the area, at one point supporting over 700 residents. The settlement was shut down in the 1950s, and in the 1960s, the land was designated as part of the broader National Capital Open Space System. In the 1970s, the area was officially named Stirling Park, in honour of Sir James Stirling, a British naval officer and colonial administrator who served as Western Australia's first governor. However, this name is now considered contentious, as Stirling's wealth was thought to be tied to slavery, and he was responsible for ordering the first massacre of Noongar people in Western Australia (Arnott 2022). Recognising this history, renaming the park to Gurubang Dhawura was an important step in acknowledging the wrongs of the past. Today, NCA manages both the Indigenous and European history of the area. The European history includes remains of the historical Westlake settlement such as building foundations and relics from the workers' cottages.

3.1.2 Ecological Condition

Gurubang Dhawura is a valuable remnant of natural bushland within Canberra, and despite its previous land use and proximity to urban areas, the Park retains high ecological values including large patches of intact BGW and several areas of derived native grassland. Gurubang Dhawura supports a broader ecosystem of native pollinators, woodland birds, and other threatened species, reinforcing its conservation importance, including one of the largest remaining populations of the endangered Button Wrinklewort.

There are also areas of Gurubang Dhawura that function as an urban amenity park, in contrast to the natural woodland, with areas of open fields of exotic-dominated ground cover, which are mown regularly and include planted European deciduous trees .


Photos 1 and 2. Groundcover revegetation plots (L) - note the encroachment of Chilean Needle Grass, and high quality woodland area (R).


Photo 3 and 4. Mature Oak Trees (L) and European Ash trees (R).

3.1.3 Management History

In 2009, the NCA, FOG, ANU Fenner School volunteers and Yarralumla Residents signed a formal agreement for ongoing management of the site which resulted in a considerable amount of investment and volunteer work supported by NCA and other grants. Activities included weed control, erosion control, research, revegetation, cultural activities and education.

Woody weed control includes Blackberry and native non-local colonisers including Argyle Apple (*Eucalyptus cinerea*), Oven's River Wattle (*Acacia pravissima*) and Knife-leaf Wattle (*A. cultriformis*). Herbaceous and grassy weed control has included African Lovegrass, Serrated Tussock, Chilean Needle Grass, Verbascum, Periwinkle, St John's Wort and many others. This includes initial control and ongoing follow up through NCA's ongoing program. This has been documented on the ACT Government treated weeds spatial mapping since 2019.

Ecological burning has been undertaken in 2011, 2013, 2014, 2016 and 2017 with follow up activities such as weed control.

Erosion along paths has been addressed.

Other activities have included Button Wrinklewort genetic research and annual monitoring of extent.

3.1.4 Management Issues

The main management issues are the continual spread of weeds which are managed ongoing, dumping of rubbish which is responded to as it occurs and illegal access to some areas. Blue Gum Point presents a community concern due to illegal access and other issues, although connected to ACT land .

3.1.5 General Recommendations

a) Adequately resource and correctly schedule weed management for target species:

- Grassy weeds should ideally be treated by spot spraying three times per year (winter for African Lovegrass, spring for Paspalum and summer for Chilean Needlegrass) to ensure effective control. Care should be taken when controlling pasture species as they can provide cover in areas where there is an increased risk of invasion by higher priority transformer weeds such as African Love Grass, Chilean Needle Grass and Serrated Tussock. In some cases, it is better to leave pasture grasses until there is a program for replacement e.g. native grass seeding or planting.
- Eradication of Vinca and Pickeral Weed is a very high priority, in particular the prevention of further spread into clean areas.
- Cut and dab invasive woody weeds under 3m (Tasmanian Blue Gums, Oak, Pine and Sweet Briar, Box Elder, Willows, Oven's Wattle, Cotoneaster, European Ash, Cootamundra Wattle and English Elm) that are not providing essential habitat or amenity. For mature non-native species, seek to strategically remove up to 20% of the remaining mature trees per year via stem injection and / or felling, and replace with native trees which will contribute to NCA Tree Management Policy (Target 1: Tree canopy cover will increase from 33% to 40% by 2030).

b) Reduce mowing and use mowing as a strategy to manage weeds and ecological values.

- Review and modify the mowing regime, if possible, to foster natural regeneration of native groundcover species. Ideally, slashing should be conducted when native species are not in

a critical stage of their phenological cycle i.e. flowering or setting seed. Slashing in late summer is recommended for C3 grass-dominated areas and should not be cut shorter than 150mm.

- Mowing should be focused in disturbed land at Westlake, and a narrow fire break on the western border.
- Care should also be taken not to spread grass weeds further via mowing equipment, although it is recognised that this is difficult when there is a mixture of weeds and native grasses in the same location.

c) Threatened species management.

- Prioritise the protection of Button Wrinklewort populations. Ensure weed sprayers are able to identify potential Button Wrinklewort to avoid any off target spraying impacts. This includes identification of individual plants outside flowering periods. Button Wrinklewort are highly vulnerable to grazing due to their palatability and sensitivity to soil disturbance.
- Protection from grazing herbivores such as kangaroos and rabbits may be required in restored or regenerating areas (e.g. chicken wire mesh fencing or temporary fencing).
- Regular monitoring and adaptive management will help ensure successful plant establishment. This is a good activity for FOG volunteers who have been undertaking a lot of the monitoring work to date.

d) Ecological Burning.

- Undertake ecological burning to reduce biomass, enable germination of a diversity of native species and to reduce the weed burden.
- Ensure resources are available for follow up weed control to promote native diversity.

e) Access and visitor experience.

- Formalise or close access to tracks, trails and carparks to prevent additional soil compaction and disturbance encroaching into Gurubang Dhawura (Stirling Park).
- Enhance visitor experience with track management and signage.
- Consider areas where educational signage may add to the visitor experience and provide the opportunity to raise awareness of particular values or issues.

3.1.6 Site Specific Recommendations

Maps 1-7 show restoration actions required at Gurubang Dhawura

Stirling Park Grassy Ecosystem Restoration Plan - East

- Eucalypt Thinning
- Existing Revegetation
- Regeneration Area
- Weed Control
- Woody Weeds
- Track Works

0 0.04 0.09 0.18 Kilometers

N

ENVIRONMENTAL RESTORATION DESIGN & PLANNING

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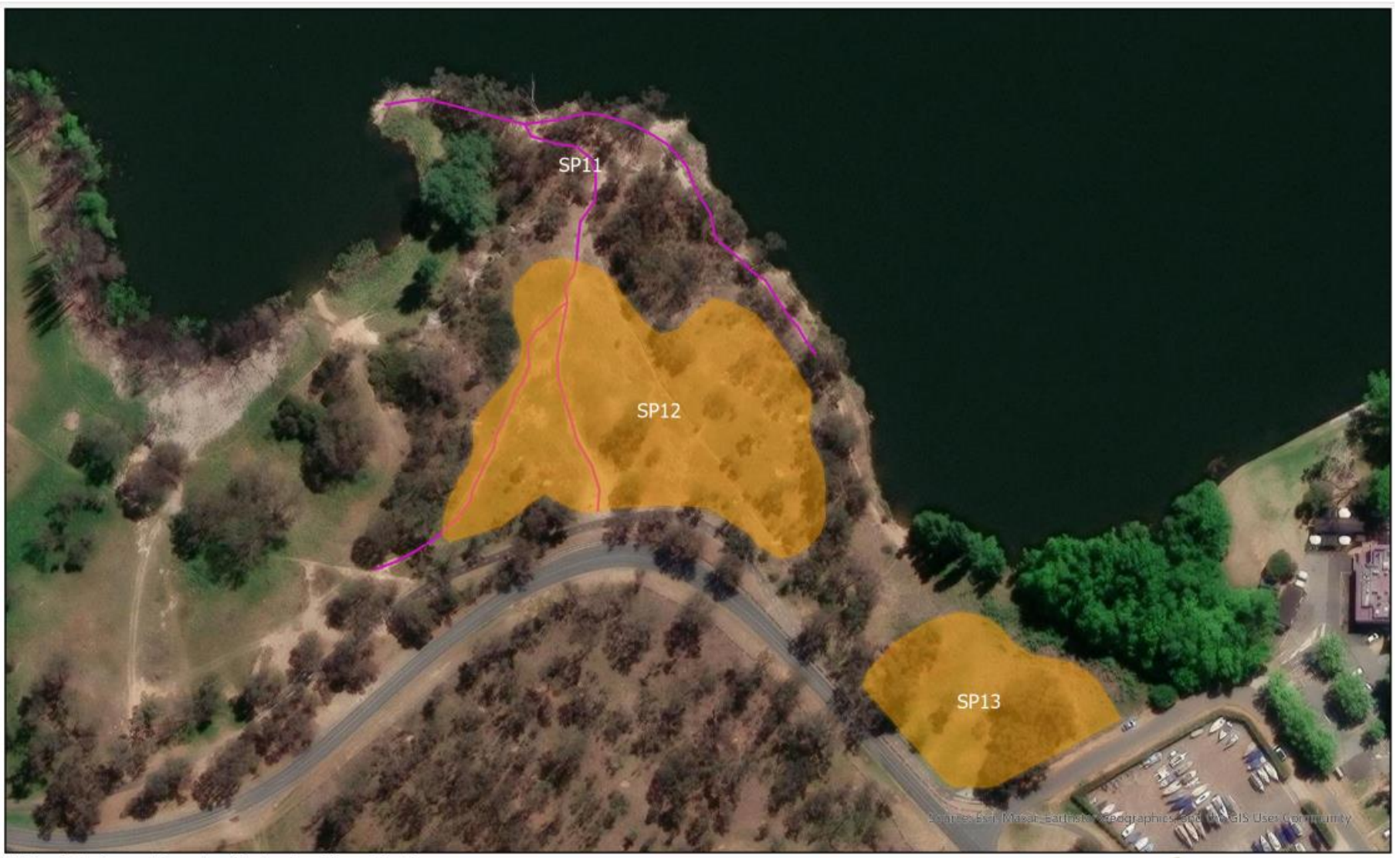

Stirling Park Grassy Ecosystem Restoration Plan - North

Weed Control

Track Works

0 0.02 0.04 0.07 Kilometers

N

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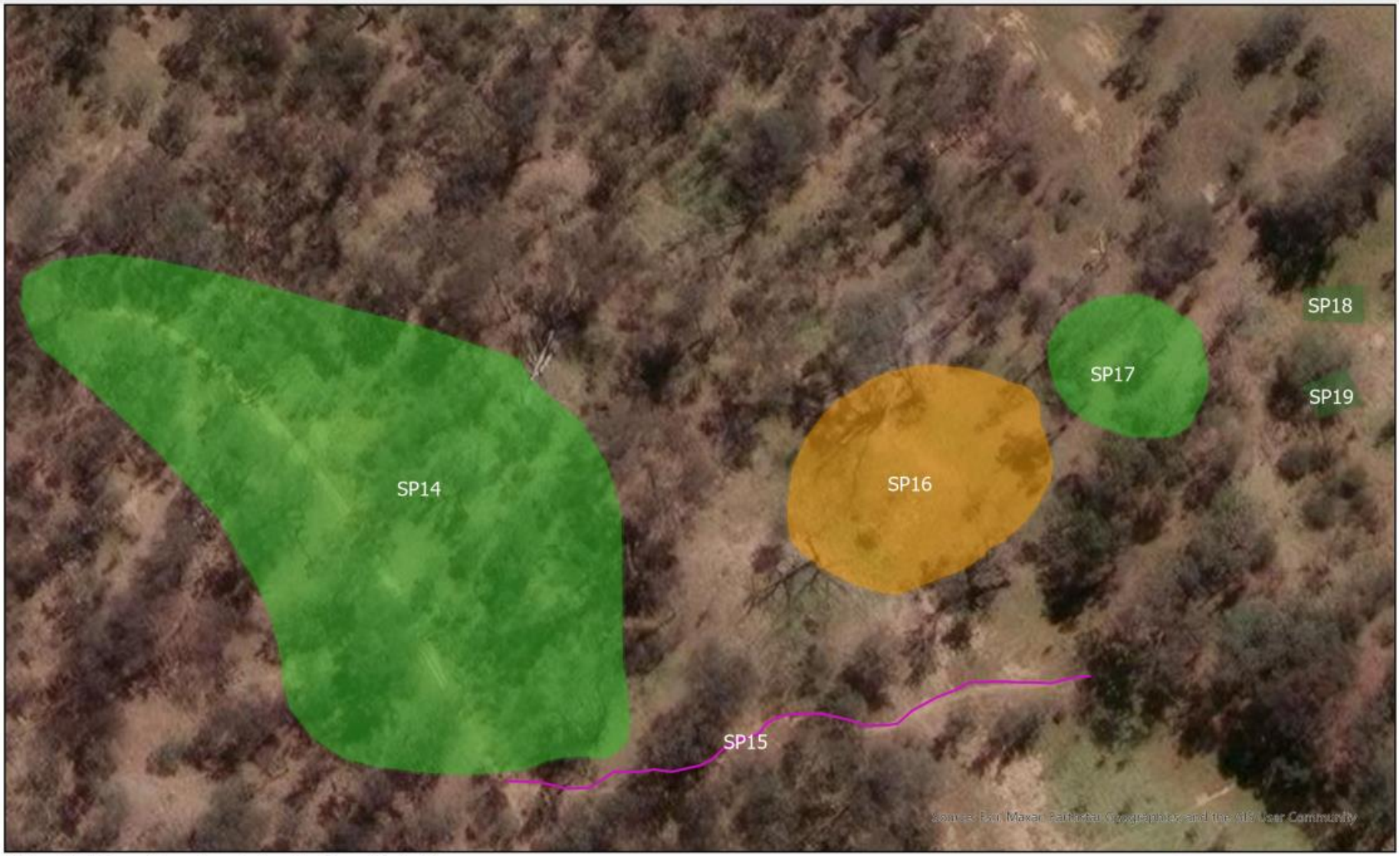

Stirling Park Grassy Ecosystem Restoration Plan - Central 1

Existing Revegetation
Regeneration Area
Weed Control
Track Works

0 0.01 0.01 0.03 Kilometers

N

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Stirling Park Grassy Ecosystem Restoration Plan - South

- ERDP tidyPoints
- Existing Revegetation
- Non Specific
- Regeneration Area
- Revegetation Open Scattered
- Weed Control
- Woody Weeds

0 0.02 0.04 0.09 Kilometers

N

ENVIRONMENTAL RESTORATION DESIGN & PLANNING

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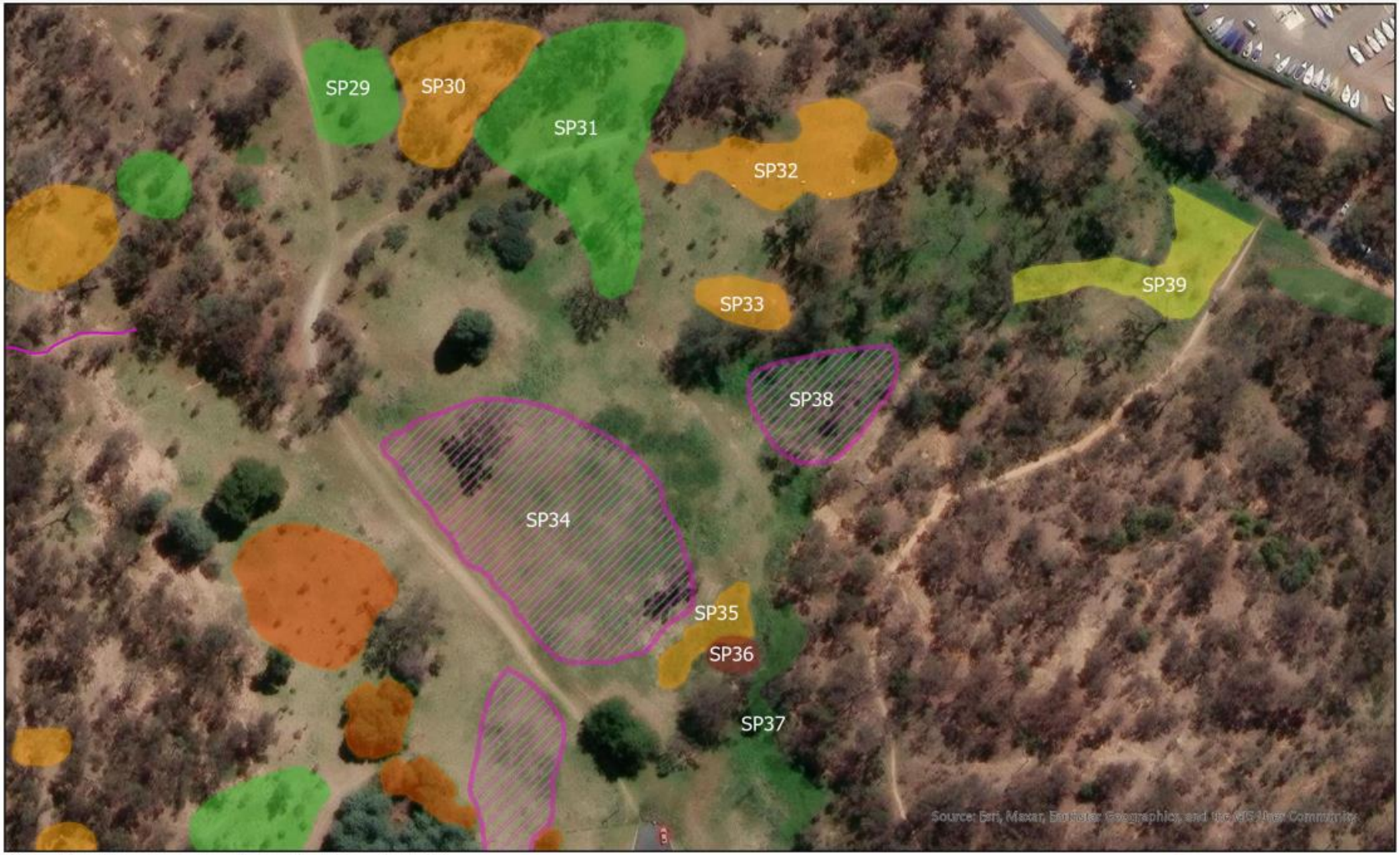

Stirling Park Grassy Ecosystem Restoration Plan - Central 2

- Existing Revegetation
- Non Specific
- Regeneration Area
- Revegetation Open Scattered
- Revegetation Poa Carex
- Weed Control
- Woody Weeds
- Track Works

0 0.02 0.04 0.07 Kilometers

N

ENVIRONMENTAL RESTORATION DESIGN & PLANNING

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Stirling Park Grassy Ecosystem Restoration Plan - Central 2

- Existing Revegetation
- Non Specific
- Regeneration Area
- Revegetation Poa Carex
- Woody Weeds

0 0.02 0.04 0.09 Kilometers

N

ENVIRONMENTAL RESTORATION DESIGN & PLANNING

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3.1.7 Table of Priorities

Recommended Actions	Priority	Site Codes
Control priority groundcover / grassy weeds in intact high-quality grassland (Button Wrinklewort populations) and woodland areas.	Very High	SP3, SP9, SP10, SP18, SP19, SP27, SP29, SP31, SP42
Contain and control Blue Periwinkle and Japanese Honeysuckle (and other exotic species)	Very High / High	SP35, SP36, SP37, SP38, SP44
Control woody weeds under 3m (invasive native species and exotics) that are not providing essential habitat or amenity. Plan to remove additional mature non-native trees at 20% per year.	Very High / High	SP1, SP14, SP37, SP42
Control priority groundcover / grassy weeds in intact high-quality grassland and woodland areas.	High	SP16, SP17, SP20, SP21, SP30, SP32, SP33
Undertake revegetation – swampy meadow	High	SP39
Contain grassy weeds by modifying mowing regime to ensure threatened species are not mown when flowering or setting seed. Clean mowing equipment and reduce unnecessary mowing that encourages exotic sucks to spread.	Medium	SP12, SP13, SP28, SP40, SP46
Undertake revegetation – woodland	Medium	SP28, SP, 30, SP32, SP33, SP41
Undertake revegetation – swampy meadow	Medium	SP37
Restrict tracks and / or carpark access	Medium	SP11, SP15, SP22
Control woody weeds (invasive native species and exotics). See above.	Low / Medium	SP4, SP5, SP6, SP7, SP8, SP24, SP25, SP26, SP39, SP41, SP45
Visitor services / interpretations signage	Low	SP34

3.2 Yarramundi Grassland

Yarramundi Grasslands are located on the western side of Lake Burley Griffin, running along Lady Denman Drive, with the Lindsay Pryor Arboretum on one side and the Yarramundi Cultural Centre on the other. Location is shown in Figure 5.

Figure 5. Yarramundi Reach located on the banks of Lake Burley Griffin between Lindsay Pryor Arboretum and Yarramundi Cultural Centre.

3.2.1 Land Use History

Historically, the grassland would have been used as a food and fibre resource for traditional owners, who managed the region's grasslands and woodlands for tens of thousands of years prior to European settlement. The area continues to hold deep cultural significance to the Ngunnawal people.

After European settlement, the area was included as part of the larger Yarralumla sheep station. With the construction of the lake in the 1960s, the reach became a prominent lakeside area and was incorporated as part of the National Capital Open Space System. The site is now managed for conservation, recreational use, cultural events, and areas for outdoor education and Indigenous heritage interpretation. The grassland is often described as one of the best-conserved open Natural Temperate Grasslands in Canberra.

3.2.2 Ecological Condition

The grassland vegetation across this site is dominated by native C4 perennial species, such as Kangaroo Grass (*Themeda triandra*), with remnant Wet Tussock Grassland along an ephemeral drainage gully. The site also supports a variety of native forbs, such as Common Everlasting Daisies (*Chrysocephalum sp*), Bluebells (*Wahlenbergia* spp.), Bulbine Lily (*Bulbine bulbosa*), and Blue Devil (*Eryngium ovinum*).

Apart from a few mature Black Cypress Pines, natural canopy cover is largely absent, which is typical of NTG. A mixture of exotic, non-local native, and native species, have been planted historically and are scattered along the edge of the Lake, along the road, and around the cultural centre located adjacent to the site.

Block 31 (Molonglo Valley, Section 0), also managed by NCA, sits upstream between Lady Denman Drive and Tuggeranong Parkway and contains dense infestations of Blackberry, African Lovegrass, Chilean Needlegrass, Serrated Tussock, St John's Wort, and non-local Acacia species. Bird dispersal, particularly through droppings, is believed to be a major source of blackberry reinfestation in the grassland, making control efforts an ongoing challenge. There is also a growing threat from ALG infestation from the adjoining Lindsay Pryor Arboretum.

The shoreline of Lake Burley Griffin and associated riparian zone condition is generally in poor health and dominated by weed species such as Phalaris, Willow, and Poplars. Alligator Weed is also present in small patches along the shoreline. Alligator Weed is a Weed of National Significance (WONS) and poses a significant threat to aquatic ecosystems due to its aggressive growth habits and ability to outcompete native species. Additionally, there are expanding dense patches of Knife-leaf Wattle.

Photos 5 and 6 Site Overview in 2025 (L) and vegetation post 2024 burn (R).

Photo 7. Exotic plants established along the edge of the Lake.

Yarramundi Grassland supports a population of the threatened Striped Legless Lizard (*Delma impar*), detected in 1991, 1993, 2000 and 2014. Updated records of individuals are not publicly available, but the area is currently identified as Striped Legless Lizard habitat (ACTMapi). The Perunga Grasshopper (*Perunga ochracea*), a species declared as vulnerable under the *ACT NC Act 2014,* has also been recorded at the site. There is one historical record of the Golden Sun Moth at Yarramundi Grassland, but the habitat is considered to be marginal (Sharp, 2016).

3.2.3 Management History

Between 1963 and 1991 the site was mown irregularly in patches for fire hazard reduction purposes, with more frequent mowing along the cycle path and around the building. Mowing ceased with the discovery of the presence of Striped Legless Lizard in 1991. No further mowing was undertaken in the site between 1991 and April 1994, intending to reduce impacts on the Striped Legless Lizard (a practice no longer supported).

The general advice throughout guidelines produced around 1994 was to undertake herbaceous and woody weed control, and to reduce biomass (and remove cut grass if slashed). The initial recommendations were for the site to be rotationally mown over a three year period to retain longer grass habitat for the Striped Legless Lizard and were later revised so that the entire site was to be mown annually between autumn and early spring. From 1994 to 2003 irregular mosaic mowing was undertaken, but the site was not mown between 2003 and 2009 and in 2009 was found to contain a very high biomass, with significant deterioration to the structure and composition of the grassland which needed to be addressed (Sharp 2009).

The main focus for efforts since 2009 by the NCA and FOG have been to manage weed encroachment, biomass buildup and loss of biodiversity. The majority of recommendations from the 2009 Ecological Plan (Sharp 2009) were achieved including weed control, biomass management for ecological outcomes and fire mitigation and landscape protection and fencing have been achieved and this work continues.

More recently there have been a number of additional activities including mowing trials in 2017, a grassland scrape to trial this revegetation technique, a project relating to Kangaroo grazing in lowland grassy ecosystems and a project looking at how fire has influenced seeding recruitment. NCA has also trialled grassland restoration using sterile rye corn and other techniques to alter soil conditions to favour native grasses and forbs.

Finally, the ACT treated weeds spatial layers show a significant amount of weed control annually since 2019. This is a mixture of contract weed control and volunteer efforts.

3.2.4 Management Issues

a) Weed Management

- Weed encroachment of the scrape sites
- Weed encroachment in burnt areas.
- Woody weeds and Alligator Weed along the shore of Lake Burley Griffin Shoreline.
- High priority woody weeds across the site including Blackberry and native, non-local colonisers Cootamundra Wattle.
- Grassy and herbaceous priority weeds including African Lovegrass, Serrated Tussock and St John's Wort which threaten high quality NTG and SLL habitat.

b) Biomass Management

- Spread of weed seed by machinery used to manage biomass
- Burning in degraded areas encourages weed seed germination which needs to be managed
- High biomass build up reducing structural connectivity for reptiles.

3.2.5 General Recommendations

a) Burning as a tool for biomass management:

- Review burning plan to undertake burns at a frequency that maintains biomass between about 2 and 4 t/ha and at intervals of approximately 3 years.
- Undertake follow-up weed control after burns and following weed control by contractors to reduce re-infestation.

b) Adequately resourced and correctly scheduled weed management for the target species:

- Grassy weeds should ideally be treated by spot spraying three times per year (winter for African Lovegrass, spring for Paspalum and summer for Chilean Needlegrass) to ensure effective control.
- Control invasive woody weeds under 3m (Blackberry and Cootamundra Wattle) that are not providing essential habitat. Blackberry can be slashed using a flail mower, allowed to reshoot for 6 weeks and sprayed with Metsulfuron. This reduces the amount of chemical and the effort required.
- Goats have also been used to control Blackberry, but it is getting more difficult and expensive to obtain goat herds.
- For mature non-native species, seek to strategically remove up to 20% of the remaining mature trees per year via stem injection and / or felling, and replace with native trees which will contribute to the NCA Tree Management Policy (Target 1: Tree canopy cover will increase from 33% to 40% by 2030).

c) Use mowing only as a strategy to manage weeds and ecological values:

- There is very little mowing at Yarramundi Reach except for fire breaks and the bike path. Slash is always removed.
- If burning is not possible, slashing remains a backup plan.
- If slashing is required, it should be conducted when native species are not in a critical stage of their phenological cycle i.e. flowering or setting seed. Slashing in late summer is recommended for C3 grass dominated areas and should not be cut shorter than 150mm.
- Care should also be taken not to spread grass weeds further via mowing equipment, although it is recognised that this is difficult when there is a mixture of weeds and native grasses in the same location.
- Establish ‘last lines of defence’ where exotic grasses threated areas of good quality grassland. Use brush-cutters to slash the exotic grasses in early spring, before Phalaris and Cocksfoot set seed, to create a buffer and reduce likelihood of viable seed blowing into the grassland.

d) Threatened species management.

- Continue to monitor NTG in the high value, good condition areas FOG is frequently working in.
- Continue planting to increase competitiveness of native cover.
- Place rocks (aim for 10-15% cover)to increase microhabitats for Striped Legless Lizard. Aim for 10-15% rock cover, this rate will provide sufficient habitat but will not overly fragment grassland connectivity. Proposed rock locations on maps below.

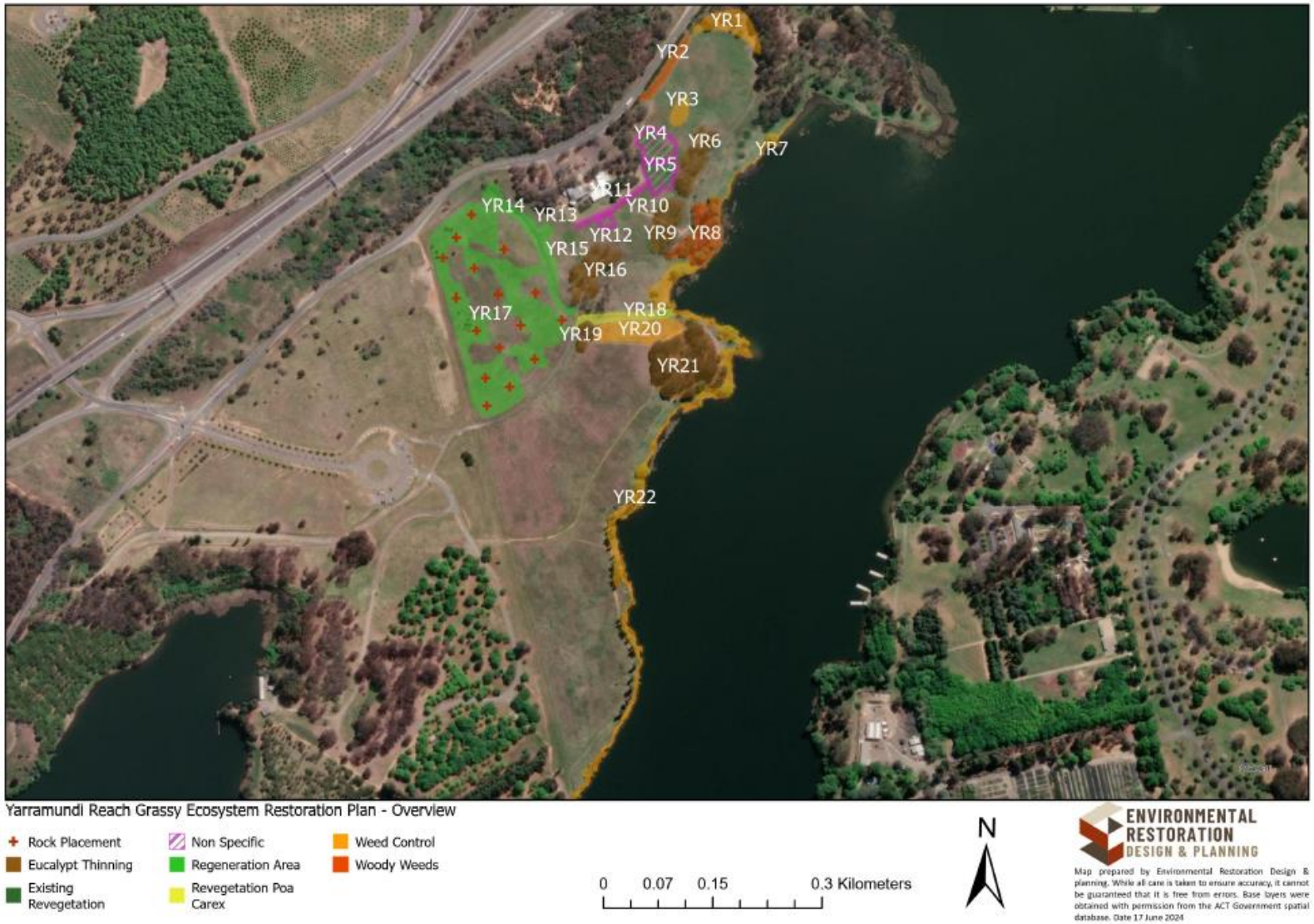
e) Access and visitor experience with a track and signage.

f) Undertake revegetation trials using sterile rye seed as a temporary cover crop to provide competition for weeds and to enable the regeneration of native grasses. There are plans to undertake trials along roadside verges to try to achieve clean boundaries and transitional areas. The results of these trials will inform future planning in other areas.

g) Support project works undertaken by ACT Natural Resources Management in consultation with NCA. Works include spray and sow grassland restoration, replanting with mycelium inoculated plants and creation of forb nodes and follow up weed control. Refer to the works plan for specific details.

3.2.6 Site Specific Recommendations

Maps 8-11 show the location and nature of restoration action required at Yarramundi Grassland.



Yarramundi Reach Grassy Ecosystems Restoration Plan - North

- Eucalypt Thinning
- Woody Weeds
- Non Specific
- Weed Control

0 0.02 0.04 0.07 Kilometers

N

ENVIRONMENTAL RESTORATION DESIGN & PLANNING

Map prepared by Environmental Restoration Design & planning. While all care is taken to ensure accuracy, it cannot be guaranteed that it is free from errors. Base layers were obtained with permission from the ACT Government spatial database. Date 17 June 2024

Yarramundi Reach Grassy Ecosystems Restoration Plan - Central

- Rock Placement
- Eucalypt Thinning
- Existing Revegetation
- Non Specific
- Regeneration Area
- Revegetation Poa Carex
- Weed Control
- Woody Weeds

0 0.01 0.03 0.05 Kilometers

N

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Yarramundi Reach Grassy Ecosystems Restoration Plan - Southwest

- Rock Placement
- Eucalypt Thinning
- Existing Revegetation
- Regeneration Area
- Revegetation Poa Carex
- Weed Control
- Woody Weeds

0 0.05 0.1 0.2 Kilometers

N

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3.2.7 Table of Priorities

Action	Priority	Area
Control priority groundcover / grassy weeds in intact high quality grassland and woodland areas.	Very High	YR14, YR17, YR15
Control Alligator weed, Serrated Tussock and African Love Grass.	Very High	YR7, YR22, YR1, YR2, YR3, YR18
Maintain existing scrape and sow sites.	Very High	YR10, YR13
Contain African Love Grass and other grassy weeds.	High	YR1, YR2, YR3, YR18
Contain and control St John's Wort (sensitive areas).	High	YR14, YR20
Undertake burning for biomass management.	High	YR17, YR20
Control woody weed regeneration (including native invasive species).	Medium	YR6, YR7, YR 8, YR9, YR16, YR18, YR21
Undertake trail slashing for biomass management and weed control. Include strip along the western bollard edge at YR11.	Medium	YR5, YR11
Undertake revegetation – swampy meadow.	Medium	YR14
Reestablish and expand grasslands through spray and sow methods.	Low	YR4, YR12
Control mature woody weeds (including non-local natives).	Low	YR8

3.3 Guilfoyle St Grassland

This small grassland occupies approximately 0.8 hectares of National Capital Authority (NCA) land and is located between Guilfoyle Street and Adelaide Avenue in Yarralumla (Figure 6). While the grassland is predominantly overrun by invasive species such as African Lovegrass, Chilean Needlegrass and pasture grasses such as *Bromus sp.*, native plants persist including Kangaroo Grass (*Themeda triandra*), Wallaby Grasses (*Rytidosperma sp*) and Clustered Everlastings *(Chrysocephalum apiculatum),* offering a foundation for ecological restoration.

Figure 6. Guilfoyle Street Grassland, Yarralumla. Source: ACTMapi

3.3.1 Land Use History

There is not much known about the history of this site, other than it is regularly mown for fire fuel management and aesthetics synonymous with its location in an urban area.

3.3.2 Ecological Condition

Guilfoyle St Grassland contains native grassland identified as NTG by the ACT Government (2005), although it is possible that it is actually a derived grassland from a Box Gum Grassy Woodland community. In either case, it meets the criteria as being endangered under the *EPBC Act* and *ACT NC Act 2014* although it is in a degraded state with reference to benchmark communities. A row of planted Eucalypts along Adelaide Avenue borders the site. Historical records indicate the presence of Button Wrinklewort populations here, adding to the site's conservation significance. There is a high cover of Chilean Needlegrass along the edge of the grassland, together with Paspalum, Wild Oats and Bromus.

This is not a high priority in terms of grassland conservation more broadly, but its location offers good opportunities for education and ongoing plant trials, particularly if someone in the local community is willing to adopt the care of the site ongoing. Alternatively, this site might be a priority as an offset for the proposed development of Light Rail stage 2b to Woden.

Photo 8 and 9. Kangaroo Grass found across the site (L) and the Eucalypt stand along Adelaide Av (R).

Photos 10 and 11. Regularly mown strip at Guilfoyle Grassland (L) and the pasture grass that dominates the site (R).

3.3.3 Management History

The boundary along the roadside is regularly mown, which has also facilitated the spread of Chilean Needle Grass and Paspalum. The plantings along the road are mature and possibly established many decades ago for screening. The site is managed for aesthetics and fire hazard reduction. The NCA strategy for Guilfoyle St has comprised of strategic slashing and raking of thatch followed by spot spraying of identified weed species. The raking of thatch assists with the environment of the Golden Sun Moth, and this is completed annually around August September.

3.3.4 Management Issues

a) Weed Encroachment

- Chilean Needle Grass.
- African Love Grass.
- Paspalum.
- Potential regeneration of Eucalypts into the grassland.

b) Biomass Management

- Excessive mowing along the road.
- Not managed for specific outcomes.

c) Loss of Biodiversity

- Loss of forb diversity.

3.3.5 General Recommendations

a) Protect areas with persisting NTG values.

- Undertake baseline monitoring (flora and fauna) at this site so that the outcomes of future restoration actions can be assessed.
- Use a combination of slashing and targeted chemical control (spot spraying) to treat grass weeds three times per year to ensure adequate treatment of all grass weed species before they set seed.
- Use cool burning as a technique to manage biomass if appropriate (with regards to bushfire management operations plans). It is a preferable option if biomass is very dense, regular mowing is causing the grassland values to degrade and facilitating the spread of weeds.
- Monitor the boundary near planted Eucalypts and remove any saplings (cut and dab method) regenerating in the grassland.
- The verge that is densely infested with African Lovegrass along Guilfoyle Street is a good area to implement a trial with scape and sow or compost techniques to combat ALG.

b) Plant and maintain investment into good quality patches of grassland

- Plant suitable native grassland species such as Kangaroo Grass and Wallaby Grasses, as well as forb species such as Blue Devil and Native Flax to increase native grassland species representation and diversity. Native grass seeding could also be considered.
- Site preparation would need to include knock down spraying, spot cultivation and mulching as well as ongoing weed management. Note that the relative effort versus outcome would be high but may be a good demonstration site for grassland restoration.
- Button Wrinklewort reintroduction could also be considered as resources allow. A high level of investment in maintenance would be required including site prep, follow up maintenance and communication with contractors and mowing teams to inform them of avoidance areas.

3.3.6 Site Specific Recommendations

Map 12 shows location and nature of restoration action required at Guilfoyle St Grassland.

Control of African Love Grass and Chilean Needle Grass is the highest priority, followed by monitoring and management of Eucalyptus regeneration.

The revegetation activities are a lower priority and the value of undertaking this work needs to be evaluated with regards to taking resources away from some of the other grassland areas which have higher conservation values.

This site would suit ‘Adopt a Patch’ style management if a local resident was interested.

Guillfoyle Street Grassland Grassy Ecosystems Restoration Plan - Overview

- Eucalypt Thinning
- Weed Control
- Woody Weeds

0 0.01 0.02 0.04 Kilometers

N

ENVIRONMENTAL RESTORATION DESIGN & PLANNING

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3.4 State Circle Woodland

The State Circle Woodland site is a patch of bushland situated between Capital Circle and State Circle on Capital Hill (Figure 9). Historically, this site formed part of Gurubang Dhawuraconnected Yellow Box–Blakely's Red Gum Grassy Woodland before it was dissected by urban development infrastructure. The woodland boasts native vegetation across all three structural layers and supports a small population of the endangered Button Wrinklewort. The site has been invaded by woody weeds such as Cotoneaster and Cootamundra Wattle, although efforts to remove mature plants have been successful, with management now focussing on controlling regrowth. The site also contains transformer weeds such as St John's Wort, African Lovegrass, and Chilean Needlegrass, which continue to pose a threat to native vegetation.

Figure 7. State Circle Woodland. Source: ACTMapi

3.4.1 Land Use History

There is not much known about historical land use at this site. Development has disconnected the site from Gurubang Dhawura, but ecological values remain within the site.

3.4.2 Ecological Condition

As mentioned above, native vegetation is well represented across all three structural layers, and the site supports a small population of Button Wrinklewort which are healthy and spreading. There is regrowth of numerous woody weeds such as Cotoneaster and Cootamundra Wattle, and non-woody weed species such as St John's Wort, African Lovegrass, Chilean Needle Grass, Blue Periwinkle and Verbascum which are controlled sporadically by volunteers and the NCA. The perimeter of the area is heavily mown, which sometime encroaches into the high conservation areas.

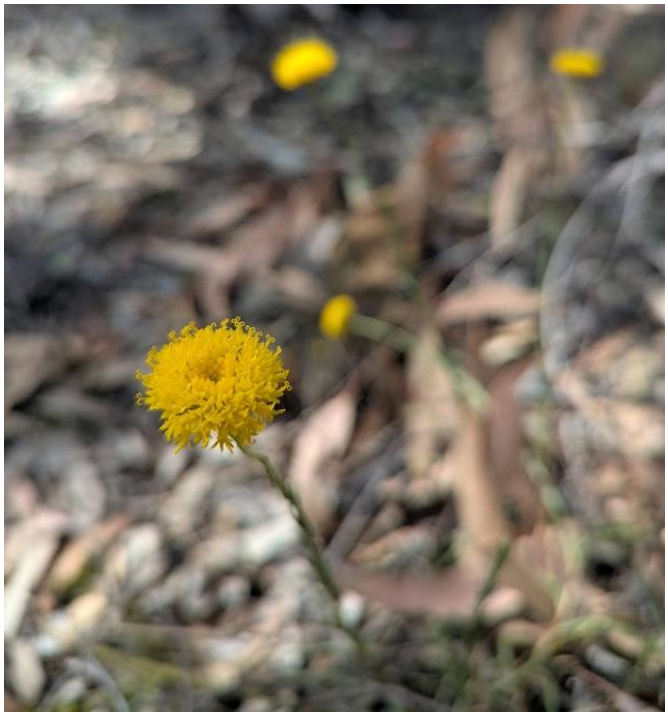



Photo 12 and 13. Threatened Button Wrinklewort (L) found beside Centenary Trail walking path (R)


Photo 14 and 15. *Austrostipa sp.* dominated patch of grassy woodland (L) and juvenile Verbascum patch on the lower slopes (R).

3.4.3 Management History

Management history has largely focussed on the removal of woody weeds, control of high priority grassy weeds, management of access along the track through mowing and mapping and documentation of the Button Wrinklewort population.

3.4.4 Management Issues

a) Weed encroachment which threatens the Button Wrinklewort population, particularly Blue Periwinkle and woody weeds.

b) Mowing which extends into some of the high conservation value areas.

3.4.5 General Recommendations

State Circle Woodland has natural capacity for regeneration of native flora given the persistence of all three structural layers. Weed control and maintenance of the open woodland structure are the main recommended activities.

a) Control woody and high priority weeds across the site.

- Immediate removal of Blue Periwinkle threatening Button Wrinklewort populations.
- Cut and dab woody weeds such as Cootamundra Wattle whilst still under 3m.
- Groundcover weeds should be treated while infestations are low using a combination of manual removal and targeted chemical application (spot spray) to reduce damage to off target species. Paterson's Curse, St John's Wort, Chilean Needle Grass and African Lovegrass working out from areas of highest conservation value.

b) Protect and expand populations of Button Wrinklewort.

- Undertake baseline monitoring (flora and fauna) at this site so that the outcomes of future restoration actions can be assessed.
- Focus on controlling invasive species such as African Lovegrass and Chilean Needlegrass through methods of targeted herbicide application and manual removal.
- Expand and reinforce population genetics by employing translocation and propagation techniques, using seeds or cuttings collected from existing populations under permit. The conservation of populations of Button Wrinklewort requires a multi-faceted approach guided by the National Recovery Plan (NCA 2020).
- Connect isolated populations by nominating buffer zones that are free from mowing. Reduce mowing in the high conservation value areas to reduce weed spread and enable Wrinklewort regeneration.

c) Revise mowing regime to reduce the footprint which encroaches on Button Wrinklewort populations. A physical barrier may need to be considered to ensure this occurs effectively.

3.4.6 Site Specific Recommendations

Map 13 shows location and nature of restoration action required at State Circle Woodland.

State Circle Woodland

Regeneration Area

Weed Control

0 40 80 160 Meters

N

ENVIRONMENTAL RESTORATION DESIGN & PLANNING

Map prepared by Environmental Restoration Design and Planning. While all care is taken to ensure accuracy, it cannot be it guaranteed that it is free from errors. Base layers were obtained with permission from the ACT Government spatial database. Date: 12th December 2025

3.5 O'Malley Woodland

This area is a patch of moderately high-quality grassy woodland bound by Hindmarsh Drive and Yamba Drive in Woden. This area includes the headwaters of Woden Creek and a substantial artificial wetland. The portion of land along the creek is Territory land and not managed by NCA. Connectivity within the area is significantly fragmented due to development. Proximity to urban areas has resulted in O'Malley Woodland being occasionally used as an illegal dumping site.

Figure 7. O'Malley Woodland at the corner of Hindmarsh and Yamba Drives Source: ACTMapi

3.5.1 Land Use History

There is not much known about historical land use at this site. It is a patch of woodland in the suburb of O'Malley in Canberra's South that has been spared from urban development due to its ecological values but also likely due to the steeper slopes making it less attractive for development. It is identified for diplomatic purposes, but it was never attractive for foreign missions to develop. Discussions are underway with Department of Foreign Affairs and Trade about the future of these blocks, but they are treated as conservation land by NCA and managed accordingly. Visitation is low and no walking paths are evident.

3.5.2 Ecological Condition

An environmental assessment of O'Malley Woodland was undertaken by Blue Gum Ecological Consulting in 2013 (O'Sullivan 2013). The area is dominated by Box-Gum Woodland but due to its low diversity of species, it did not meet the criteria as an endangered community under the EPBC Act (Sharp 2016).

Weed infestations are moderate, but manageable in the highest value areas. There is a significant patch of Blue Periwinkle along Hindmarsh Drive which poses a serious threat to the integrity of

the native groundcover nearby. Woody weeds are also prevalent, with large Sweet Briar (*Rosa rubiginosa*), Narrow-leaf Firethorn (*Pyracantha angustifolia),* Cootamundra Wattle, and encroaching Blackberry which are spreading from the Hindmarsh Drive boundary. There are clusters of mature Radiata Pine (*Pinus radiata*) trees across the site, however they do not appear to be spreading aggressively into areas of quality native woodland, noting that they are an ever-present threat.

There are also areas of surface rock that could potentially support native fauna although none were found during surveys (O'Sullivan 2013). Recent ACT Government mapping indicates habitat is unlikely to support PTWL (ACTMapi 2023). The site has a good range of structural diversity with native groundcover, shrubs and trees all present. Woody debris and leaf litter are present and functioning to provide niches and habitat for invertebrates.

Photos 16 and 17. Fire thorn and pine in lowest quality grassy woodland area and a rocky outcrop on O'Malley Woodland

Photo 18. Naturally regenerating woodland with structural diversity.

Photo 19. Naturally regenerating grassy woodland including woody debris and rocks for habitat. Pine stand in the background does not appear to be rapidly encroaching.

3.5.3 Management History

Woody weeds, but little else ,have been controlled over the past 10 years. This action alone however has reduced the threat of these weeds to the values of the site.

3.5.4 Management Issues

a) Weed encroachment, particularly woody weeds and Blue Periwinkle presents the highest threat to the site.

b) Dumping of rubbish and associated access by vehicles is a localised threat.

3.5.5 General Recommendations

a) Control woody and high priority weeds across the site.

- Spray Blue Periwinkle along Hindmarsh Drive in Spring when chemical will be taken up by the vigorously growing plant. Follow up removal of dead material and roots a few weeks after spraying. Monitor and spot spray.
- Cut and dab woody weeds such as Firethorn, Cootamundra Wattle, Sweet Briar, Blackberry and Pine Wildings whilst still under 3m as highest priority. Focus on establishing a last line of defence perimeter around the best quality and naturally regenerating woodland, then control weeds outwards.
- Grassy and herbaceous weeds such as African Lovegrass, Serrated Tussock, St John's Wort, Paterson's Cure and Verbascum should be treated using a combination of manual removal and targeted chemical application (spot spray) to reduce damage to off target species.

b) Rubbish Removal.

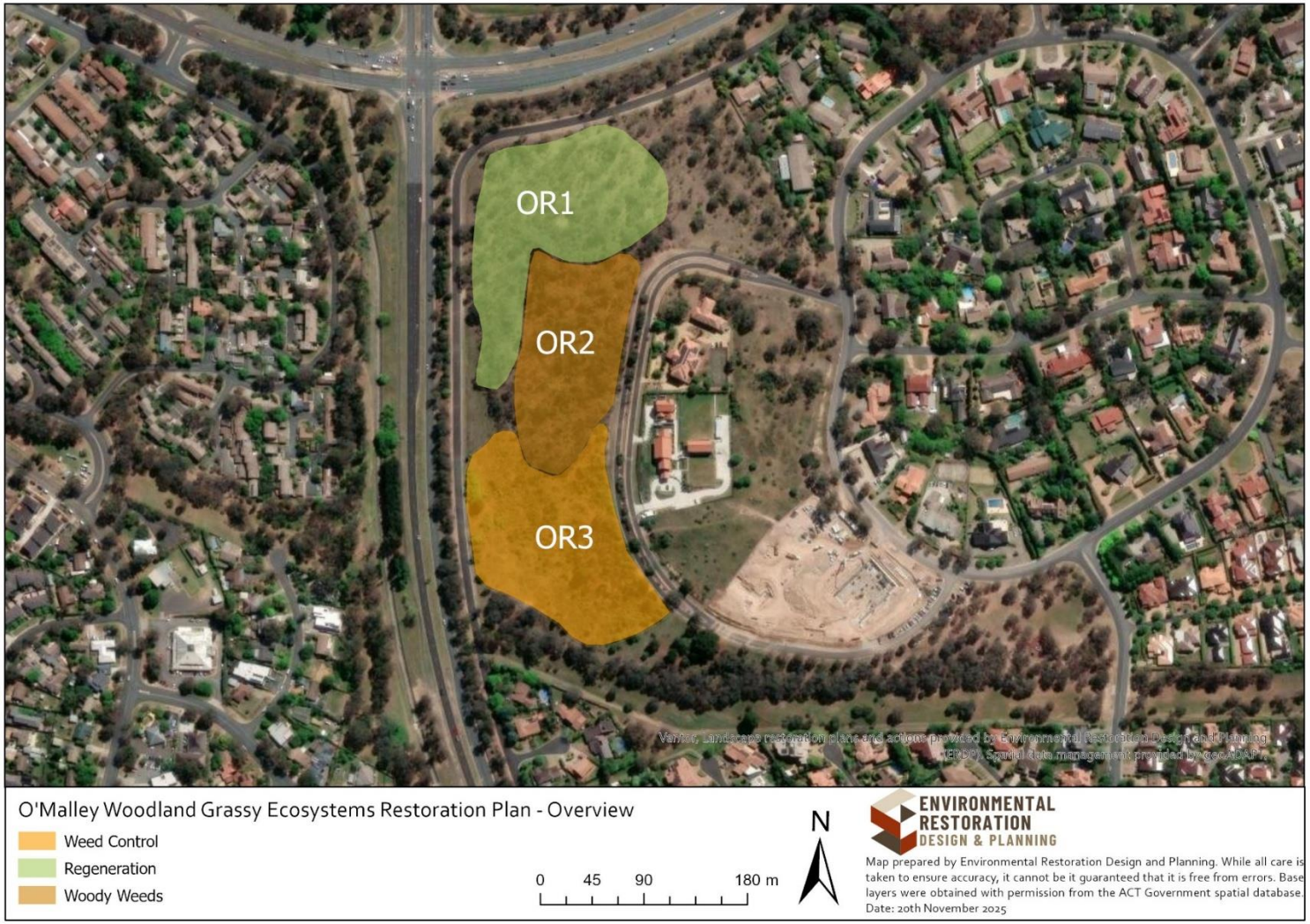
- Remove dumped rubbish as it occurs and consider erecting signage to identify the significance of the area and penalties for dumping. Consider the using cameras (or signage that indicates the use of cameras. This will potentially be an ongoing issue due to its proximity to Mugga Lane Resource Management Centre.

c) Monitoring

- Undertake baseline monitoring (flora and fauna) at this site so that the outcomes of future restoration actions can be assessed.
- Consider placing out tiles for further survey to determine if the Pink-tailed Worm-lizard does occur on the site. This is a low priority but does not take a lot of effort.

3.5.6 Site Specific Recommendations

Map 13 shows recommendations for O'Malley Woodland (O'Malley Ridge). Woody weed control is the highest priority. All other actions are low – medium.



4. Summary of Priorities – All Sites Combined

The highest priority is the protection of high-quality woodland and grassland sites and threatened species areas from threats – in particular transformer weed incursion. Prevention of further spread of weeds is more important than trying to control large patches of weeds or restore degraded sites especially where resources are limited. The exception to this is where new weeds are starting to establish and are in low densities but have the potential to be devastating. A notable example of this is Blue Periwinkle at Gurubang Dhawura (Stirling Park).

The next highest priority is to maintain sites where works have already been undertaken to protect previous investment. This includes planting maintenance, ongoing (follow up) weed control and other works.

Other enhancement works are important to improve condition, but they are a lower priority that those mentioned above. That is, it is a higher priority to prevent degradation than to fix it. Activities may include further grassland restoration, biomass management trials, planting new areas and enhancement works.

Many activities relate to ongoing land management regimes such as biomass management through burning and / or slashing, mowing for access, recreational facilities, heritage management, infrastructure and drainage. These are carried out on an as-needs basis and represent ongoing management for the most part. These tend to be incorporated into annual operations plans and budgeted for.

The table below provides a summary of activities, their relative priority, the sites to which each action applies, and a unit cost for each. The purpose of this is to enable the users to develop site-specific restoration plans for each area in line with available budgets.

4.1 Site Specific Priorities and Unit Costing

The following table provides combined priorities for all sites and an indication of costs based on unit pricing. Note that costs change in a short time frame, but this can be used as a guide to cost various activities and develop indicative budgets and works plans.

Action	Priority	Area	Unit Costs
Control priority groundcover / grassy weeds in intact high-quality grassland and woodland areas.	Very High	SP3, SP9, SP10, SP18, SP19, SP27, SP29, SP31, SP42 YR14, YR17, OR1, SC2	$1500/day x 2 operators (0.5 – 2ha/hour depending on density.
Control Alligator weed.	Very High	YR7, YR22	$1500/day x 2 operators x 2 days = $2400.
Contain and control Blue Periwinkle and Japanese Honeysuckle	Very High / High	SP35, SP36, SP37, SP38, SP44, OR3	$1500/day x 2 operators. 4-8ha / day.
Maintain existing scrape and sow sites.	Very High	YR10, YR13	Hand weeding – volunteer or contractor 2 x 3 days / year = $7200 / year

Control woody weeds (invasive native species and exotics).	Very High / High	SP1, SP14, SP37, SP42, OR2, OR3, SC1, SC3, GS2	$1500/day x 2 operators. 4-8ha / day.
Control priority groundcover / grassy weeds in intact high quality grassland and woodland areas.	High	YR15, SP16, SP17, SP20, SP21, SP30, SP32, SP33, OR1, SC2.	$1500/day x 2 operators. 4-8ha / day.
Contain and control St John's Wort (sensitive areas).	High	YR14, YR20	$1500/day x 2 operators. 4-8ha / day.
Contain grassy weeds	High / Medium	SP12, SP13, SP28, SP40, SP46 YR1, YR2, YR3, YR18, GS1	$1500/day x 2 operators. 4-8ha / day.
Undertake burning for biomass management.	High	YR17, YR20 , GS1	In-house with fire unit.
Install conservation marker posts.	High	SC2, OR1	Approx $5000
Genetic diversification – Button Wrinklewort (isolated populations)	High	SC2	Up to $5000 depending on seed source (hard to get).
Undertake revegetation - woodland	Medium	SP28, SP, 30, SP32, SP33, SP41	$5000 / ha
Undertake revegetation – swampy meadow	Medium	SP37, SP39, YR14	$5000 / ha
Undertake track and / or carpark maintenance	Medium	SP11, SP15, SP22	Quote dependant but >$20000
Undertake slashing for biomass management and weed control.	Medium	YR5, YR11, GS1	$150 / hour x 6 hours.
Control woody weeds (invasive native species and exotics).	Low / Medium	SP4, SP5, SP6, SP7, SP8, SP24, SP25, SP26, SP39, SP41, SP45, YR6, YR7, YR 8, YR9, YR16, YR18, YR21, GS3, OR2, OR3	$1200/day x 2 operators. 4-8ha / day.
Control mature woody weeds (including non-local natives).	Low	YR8	$1200/day x 2 operators x 10 days = $12000
Reestablish and expand grasslands through scrape and sow method.	Low	YR4, YR12, GS1	$90000 / ha
Visitor entry services / interpretations signage	Low	SP34	Quote dependant but > $20000

4.2 Site Specific On-ground Works Details

See Annexure 1 – separate attachment.

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