Bulwinkel Park and Surrounding Reserves, Alstonville Vegetation Restoration Plan

ballina shire council

Bulwinkel Landcare Group

EnviTE Environment

Acknowledgements

This plan has been prepared for Ballina Shire Council by EnviTE Environment to guide vegetation restoration work at Bulwinkel Park, Alstonville.

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF PLATES

LIST OF TABLES

1 SUMMARY

This vegetation restoration plan for Bulwinkel Park has been developed for Ballina Shire Council and the local community to guide restoration work at the site. The park was named in memory of the Charles Bulwinkel family who owned the adjacent land.

Bulwinkel Park is located on the north-west outskirts of Alstonville. It is bounded by Maguires Creek to the west. It is approximately 50m upstream of Lumley Park, one of the remaining Big Scrub remnants. The Big Scrub covered approximately 75,000 hectares of lowland subtropical rainforest associated with the Mount Warning volcanic soils. The original Big Scrub area was located between East Lismore, Alstonville, St Helena and Dunoon. Lowland rainforest occupies warm sheltered, lowland sites in areas of high rainfall in subtropical Eastern Australia. Due to clearing, disturbance and weed infestation, lowland rainforest is now recognised as a critically endangered ecological community under the Environment Protection and Biodiversity Conservation (EPBC) Act 1999.

This plan describes vegetation at Bulwinkel Park including vegetation species lists and management issues. The major focus of this vegetation restoration plan is to guide implementation of rehabilitation works. The current condition and regeneration potential of native vegetation has been assessed. The plan identifies threats contributing to the degradation of vegetation, provides information on weed species, weed control techniques and details strategies and recommendations for ongoing restoration works.

This plan will guide native vegetation rehabilitation at Bulwinkel Park restoration works and assist community members to improve their skills and knowledge in restoring critically endangered lowland rainforest.

1.1 Aims and Objectives

The aim of this vegetation restoration plan is to provide strategies, actions and a works schedule to rehabilitate, to the extent possible, the structure, function, integrity and dynamics of the lowland rainforest and habitat at Bulwinkel Park.

The objectives and outcomes of this vegetation restoration plan are provided in Table 1 below.

Table 1: Objectives and outcomes for restoration of vegetation communities at Bulwinkel Park

Objectives	Outcomes
Enhance the resilience and ecological function of native vegetation.	• Weeds systematically controlled. • Increase in the diversity and abundance of native species regenerating as a result of strategic control of weeds.
Reduce threats to vegetation communities	• Reduction in weed infestation.
Provide habitat for local and migratory native fauna and protect threatened species and their habitat.	• Increase in habitat for native fauna. • No net loss of threatened species or habitat.
Monitor and evaluate the progress of works.	• Record of changes to site as a result of plan implementation.

2 SITE ASSESSMENT

2.1 Locality Information

General locality information for the site is provided in Table 2.

Table 2: General locality information – Bulwinkel Park

Bulwinkel Park	
Property Owner and Address	Public Reserve Ballina Shire Council Bulwinkel Park is located at the end of Main St in Alstonville, NSW .
Lot//DP	17//263001, 332//755745, 2//609119, 171//246509
Project Area	3.20 hectares.
Geomorphology	Soils of the Wollongbar Soils Landscape occurring on Lamington Volcanics: Lismore Basalts – Tertiary basalts, with bole and minor agglomerate. Soils are mostly deep, well drained Krasnozems with shallow stonier Krasnozems on crest/upper slope boundaries and wet alluvial Krasnozems in drainage lines. Soils are highly acidic, moderately erodible with low water holding capacity and localised mass movement hazard (Morand, 1994).
Climate	The climate is transitional between warm temperate and subtropical with a marked summer rainfall maximum and distinct dry period in the late winter early spring. Summer temperatures range from 19 – 27 degrees and winter from 10 – 20 degrees. Annual mean rainfall is 1825mm (Australian Bureau of Meteorology).
Existing Vegetation Cover	Highly modified and disturbed Lowland subtropical rainforest. *Argyrodendron trifoliolatum* Alliance Suballiance *Castanospermum-Dysoxylum muelleri* (Floyd, 1990).
Threatened Species and Communities	Veiny Laceflower (*Archidendron muellerianum*) ROTAP species 3RCa is located on the south western boundary in Zone 11. Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregion is listed as an Endangered Ecological community. Lowland Rainforest is listed as a critically endangered ecological community under the EPBC Act. Koala *Phascolartctos cinereus* records are documented in adjoining vegetation. A list of threatened species located within a 5 km radius of the site is provided in section 2.4 below.
Environmental Weeds	A diverse range of weeds occur on site including trees and shrubs, vines and scramblers, groundcovers, garden escapees and exotic grasses. Dominant weed trees include Camphor Laurel (*Cinnamomum camphora*), Small-leaf Privet (*Ligustrum sinense)* and Large-leaf Privet (*Ligustrum lucidum,*). Vine weeds present include Madeira Vine (*Anredera cordifolia*), Cats Claw Creeper (*Dolichandra unguis-cati*) Edible Passsionflower. (*Passiflora edulis*) Weeds identified on site are listed in Table 3.

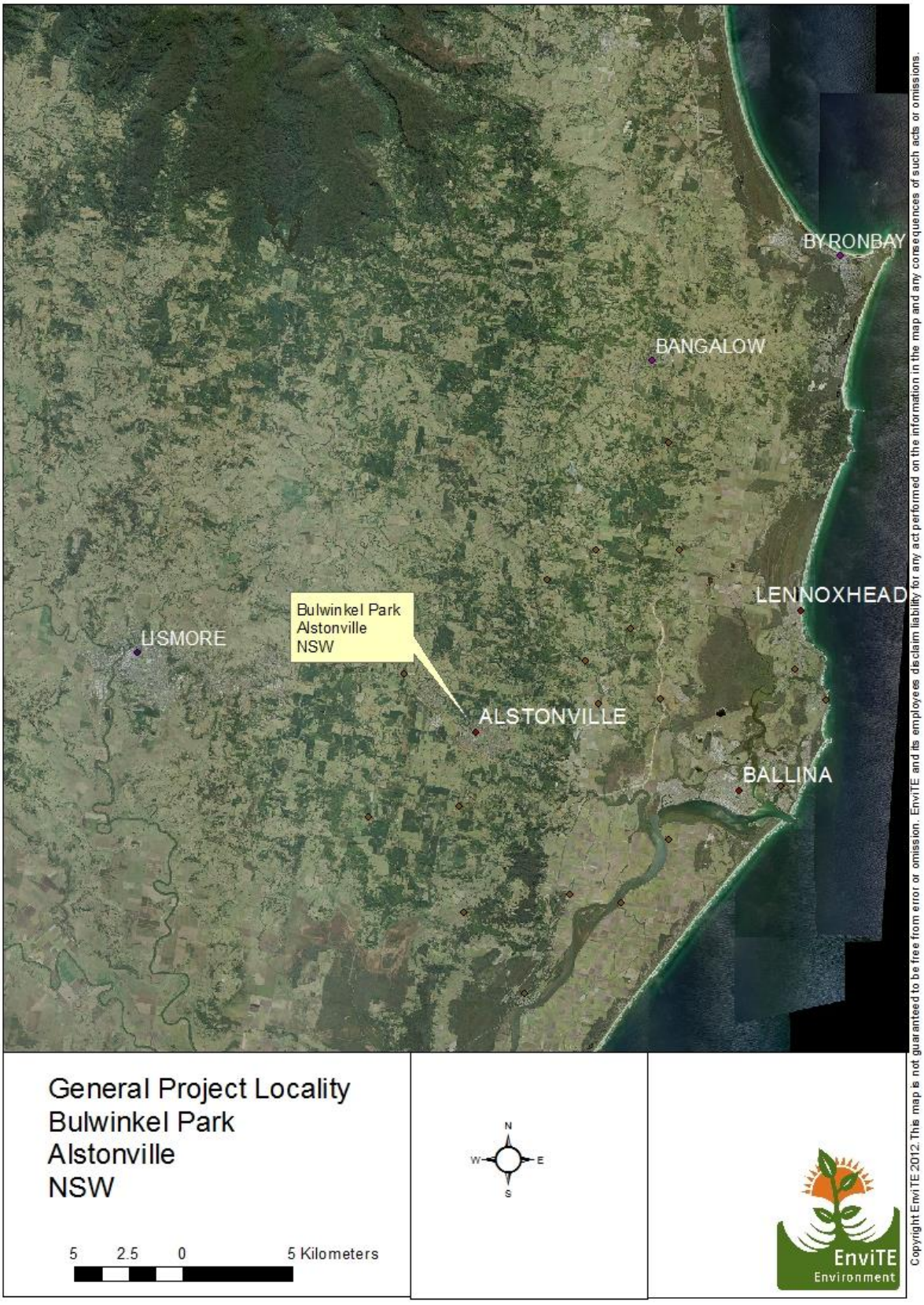

Figure 1: Bulwinkel Park location Ballina LGA

2.2 Weeds

The site has a range of environmental weed species and a variety of mixed exotic plantings encroaching from backyard boundaries. Dominant weeds found on site are listed in Table 3 below.

Table 3: Dominant weeds species

Common Name	Scientific Name
Trees & Shrubs	
Alexandra Palm	*Archontophoenix alexandrae*
Black Sepote	*Diospyros nigra*
Brazilian Cherry	*Eugenia uniflora*
Camphor Laurel	*Cinnamomum camphora*
Citrus sp	*Citrus X taitensis*
Coffee	*Coffee arabica*
Date Palm	*Phoenix dactylifera*
Cocos Palm	*Syagrus romanzoffiana*
Chinese Celtis	*Celtis sinensis*
Cadagi	*Corymbia torelliana*
Guava	*Psidium guajava*
Jacaranda	*Jacaranda mimosifolia*
Frangipani	*Plumeria sp.*
Lantana	*Lantana camara*
Large-leaved Privet	*Ligustrum lucidum*
Loquat	*Eriobotrya japonica*
Murraya	*Murraya paniculata*
Night Flowering Cestrum	*Cestrum nocturnum*
Small-leaved Privet	*Ligustrum sinense*
Slash Pine	*Pinus elliottii*
Tobacco	*Solanum mauritianum*
Winter Senna	*Senna pendula var.glabrata*
Vines & Scramblers	
Cats Claw Creeper	*Dolichandra unguis-cati*
Cape Ivy	*Delairia oderata*
Climbing Nightshade	*Solanum seaforthianum*
Corky Passionflower	*Passiflora suberosa*
Madeira Vine	*Anredera cordifolia*
Trad	*Tradescantia fluminensis*
Turtle Vine	*Callisia repens*
White Passionflower	*Passiflora subpeltata*
Edible Passionfruit	*Passiflora edulis*
Silver Leaf Desmodium	*Desmodium uncinatum*
Herbs & Groundcovers	
Blue Billy Goat	*Ageratum houstonianum*
Broad Leaved Paspalum	*Paspalum madiocanum*
Blackberry Nightshade	*Solanum nigrum*

Cuphea	*Cuphea carthagenensis*
Crofton Weed	*Ageratina adenophora*
Curly Dock	*Rumex crispus*
Kikuyu	*Pennisetum clandestinum*
Farmers Friends	*Bidens Pilosa*
Montbretia	*Montbretia crocosmia x crocosmiiflora*
Fishbone Fern	*Nephrolepsis cordifolia*
Mistflower	*Ageratina riparia*
Ragweed	*Ambrosia artemisiifolia*
Red Natal Grass	*Melinis repens*
Setaria	*Setaria sphacelata*
Tall Fleabane	*Conyza albida*
Taro	*Colocasia esculenta*
Thistle	*Onopordum acanthium*

2.3 Vegetation Management Issues (threats)

The Border Rangers Rainforest Biodiversity Management Plan, 2010, identifies Big Scrub remnants as priority areas for biodiversity conservation. The fundamental threats to biodiversity have been identified as habitat loss and modification, loss of individuals, populations and species and loss of genetic integrity.

The main threat to vegetation communities at the site is weed invasion. Extensive clearing of vegetation results in fragmentation and land degradation. Clearing and fragmentation of vegetation communities makes them more susceptible to edge effects such as invasive weeds.
When invasion of weed and other pest species occurs as a result of this disturbance the weed species on site compete with the native vegetation for resources and suppress native seedlings compromising the integrity of biodiversity values.

Invasion and establishment of exotic vines and scramblers, invasion establishment and spread of Lantana and loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants are all Key Threatening Processes (KTP) on this site, as listed on Schedule 3 of the Threatened Species Conservation Act 1995.

Lantana, Cats Claw Creeper and Madeira Vine have been identified as Weeds of National Significance (WoNS). These weeds have a significant impact on biodiversity assets including threatened species habitat, creek riparian vegetation and water quality.

2.4 Conservation Significance - Threatened Species and Communities

Lowland Rainforest in Lumley Park Reserve is directly adjacent to Bulwinkel Park and is the nearest reference community.

A mature Veiny Lace Flower tree (*Archidendron muellerianum*) a Rare and Threatened Australian Plant (ROTAP) classification 3RCa* is located on the southern edge of the remnant.

* Classification code: 3- it has a range of more than 100km, R – is Rare but with no current identifiable threat, C-Species is known to occur within a proclaimed reserve, a-Species is considered to be adequately reserved. 1000 or more plants occur within a proclaimed reserve.

Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions is listed as an Endangered Ecological Community in Part 3 of Schedule 1 of the Act and as a critically Endangered Community under the Environment Protection and Biodiversity Conservation Act 1994 (EPBC Act).

A desktop search of threatened flora and fauna records from the Atlas of NSW Wildlife indicates the presence in adjacent Lumley Park Reserve, of Ball Nut (*Floydia praealta*) and Red Lilly Pilly (*Syzygium hodgkinsoniae*) listed as vulnerable under the NSW Threatened Species Conservation Act 1995 and well as Grey headed Flying Fox (*Pteropus poliocephalus*) also listed as Vulnerable under the NSW Threatened Species Conservation Act 1995. Red Lilly Pilly and Grey-headed Flying Fox are also listed as Vulnerable under the Environment Protection and Biodiversity Conservation Act (EPBC Act). The Grey-headed Flying Fox is important to the health and maintenance of many ecosystems in eastern Australia. The species performs pollination and seed dispersal for a wide range of native trees. It contributes directly to the reproduction, regeneration and the evolutionary processes of forest ecosystems.

Koala, *Phascolartctos cinereus* records are documented in vegetation adjoining Bulwinkel Park. A list of threatened species located within a 5 km radius of the site is provided in section 2.4 below.

Threatened flora and fauna species occurring within a 5km radius of the site are listed in Table 4 and Table 5.

Table 4: Threatened Fauna species located within a 5km radius - Atlas of NSW Wildlife 2013.

FAMILY	SCIENTIFIC NAME	COMMON NAME	LEGAL STATUS
Anseranatidae	*Anseranas semipalmata*	Magpie Goose	V
Ciconiidae	*Ephippiorhynchus asiaticus*	Black-necked Stork	E1
Accipitridae	*Erythrotriorchis radiatus*	Red Goshawk	E1
Rallidae	*Amaurornis olivaceus*	Bush Hen	V
Columbidae	*Ptilinopus magnificus*	Wompoo Fruit Dove	V
Columbidae	*Ptilinopus regina*	Rose-crowned Fruit Dove	V
Campephagidae	*Coracina lineata*	Barred Cuckoo Shrike	V
Dasyuridae	*Planigale maculata*	Common Planigale	V
Phascolarctidae	*Phascolarctos cinereus*	Koala	V
Macropodidae	*Thylogale stigmatica*	Red-legged Pademelon	V
Pteropodidae	*Pteropus alecto*	Black Flying Fox	V
Pteropodidae	*Pteropus poliocephalus*	Grey-headed Flying Fox	V
Vespertilionidae	*Nyctophilus bifax*	Eastern Long-eared Bat	V

Table 5: Threatened Flora species located within a 5km radius of the project site, Atlas of NSW Wildlife, 2013.

FAMILY	SCIENTIFIC NAME	COMMON NAME	LEGAL STATUS, NSW
Apocynaceae	*Ochrosia moorei*	Ochrosia moorei	E1
Fabaceae (Faboideae)	*Sophora fraseri*	Sophora fraseri	V
Fabaceae (Mimosoideae)	*Archidendron hendersonii*	White Lace Flower	V
Lauraceae	*Cryptocarya foetida*	Stinking Cryptocarya	V
Menispermaceae	*Tinospora tinosporoides*	Arrow-head Vine	V
Myrtaceae	*Syzygium hodgkinsoniae*	Red Lilly Pilly	V
Poaceae	*Arthraxon hispidus*	Arthraxon hispidus	V

3 MANAGEMENT STRATEGY & ACTIONS

3.1 Restoration Approach

Bush regeneration aims to restore vegetation communities by working with the resilience of the native vegetation. Natural regeneration can be stimulated by systematically controlling weeds allowing native plants to re-establish. The potential for natural regeneration is highest when vegetation is reasonably healthy and there are seeds or seedlings of native plants in the soil or available from mature trees.

Bush regenerators work to control weeds in such a way that native plants replace weeds. Simply controlling weeds will not necessarily lead to a good result. It can make things worse. One weed may be replaced by another, potentially worse weed.

Bush regeneration involves primary work and ongoing follow up maintenance at reducing levels over time. The size of the area of primary bush regeneration work undertaken must be such that it can be maintained in the long term.

Planting may be required to re-establish vegetation in areas which are more degraded and lack resilience.

3.2 Vegetation Management Work Plan

A vegetation assessment was undertaken at Bulwinkel Park in March 2015. Zones have been allocated according to vegetation condition, topographical and cultural features. See Figure 2 below. The following vegetation management work plan describes the condition of vegetation in the work zones at Bulwinkel Park. Recommendations are made regarding management actions. Weed profiles are provided in Appendix 2, weed control techniques in Appendix 3 and weed control methods in Appendix 4.

Figure 2: Bulwinkel Park and Surrounds Work Zones

Figure 3: Bulwinkel and Surrounds Northern Zones

3.2.1 Zone 1

Zone 1 is located on the western edge of Bulwinkel Park and encompasses the Ken Dunstan memorial garden, Tibouchina (Tibouchina lepidota 'Alstonville') and Callistemon viminalis 'Little John' have been planted in a memorial garden here. The garden also includes several native rainforest trees and environmental weeds are common in this zone.

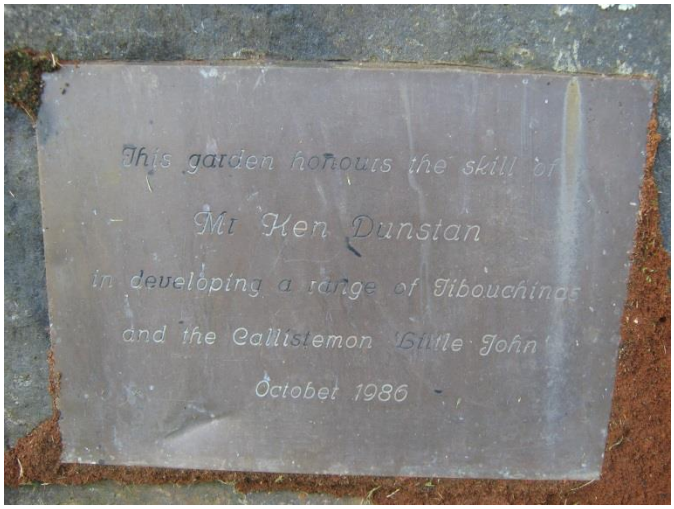

Plate 1: Ken Dunstan plaque

Plate 2: Bulwinkel Park signage

Plate 3: (left) Large-leaved Privet seedlings amongst native Basket Grass
Plate 4: (right) Tibouchina memorial tree

3.2.2 Zone 2

Zone 2 includes Maguires Creek riparian vegetation and encircles zone 1 and 2. Large mature Camphor Laurels and environmental weeds are dominant in this zone. The is some native regeneration occurring under the Camphor Laurels A diverse range of rainforest trees have been planted on the south western edge of the zone. Madeira Vine (*Anredera cordifolia*) is also present. This vine weed has been classified as a Weed on National Significance (WoNS) and is serious threat in rainforests and waterways. The edge of the zone borders the creek and zone 3 is maintained as grassland to allow views to the historic weir.

Plate 5: Maguires Creek running along the edge of zone 2 (right) with Camphor Laurel dominating the canopy.

Plate 6: Mature Camphor Laurel in the south-east corner of the zone with scattered exotics in the lower strata.

Plate 7: North-eastern edge of zone 2 with large Camphor in the canopy. Ochna, Night Blooming Cestrum and Large-leaved Privet occur in the lower strata.

3.2.3 Zone 3

This zone consists of council managed open park grassland with toilet facilities and BBQ area. No bush regeneration activities are recommended in this zone.

Plate 8: Zone 3 Looking North East towards the weir

3.2.4 Zone 4:

This zone is located on the northern side of Maguires Creek and consists of a native rainforest tree planting that is approximately 10 years old. Environmental weeds are present in the lower strata. Cats Claw Creeper (*Dolichandra unguis-cati*) is growing up into the canopy of the rainforest tree planting. Cats Claw Creeper is a serious vine weed that has been classified as a Weed on National Significance (WoNS).

Plate 9: Looking across the weir from zone 2 to zone 4.

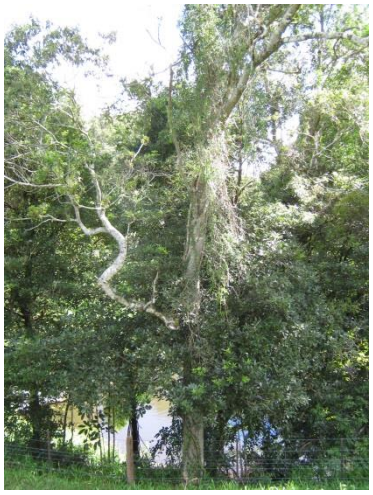

Plate 10 (left): Cats Claw Creeper climbing native trees on eastern edge.
Plate 11 (right): Good native diversity in western edge of zone 4.

3.2.5 Zone 5:

Zone 5 is located upstream of zone 2 and includes Maguires Creek riparian vegetation. This zone is heavily impacted by environmental weeds in all strata. Some native species are naturally regenerating including Creek Sandpaper Fig (*Ficus coronata*) and Myrtle Ebony (D*iospyros pentamera*). These natives are being threatened by highly competitive environmental weeds including Privets (*Ligustrum sinense and Ligustrum lucidum*), Camphor Laurel, Lantana (*Lantana camara*) and Ochna (*Ochna serrulata*).

Plate 1: Examples of the heavy weed infestation in Zone 5 with exotics such as Privets, Camphor laurel and Ochna

3.2.6 Zone 6

Zone 6 is located downstream of Bulwinkel Park on the northern bank of Maguires Creek. This zone is dominated by environmental weeds including Madeira Vine and garden escapees. The zone is narrow a with very steep creek banks. Once exotic species are controlled, planting native rainforest trees and Creek Matrush (*Lomandra hystrix*) will contribute to creek bank stabilisation.

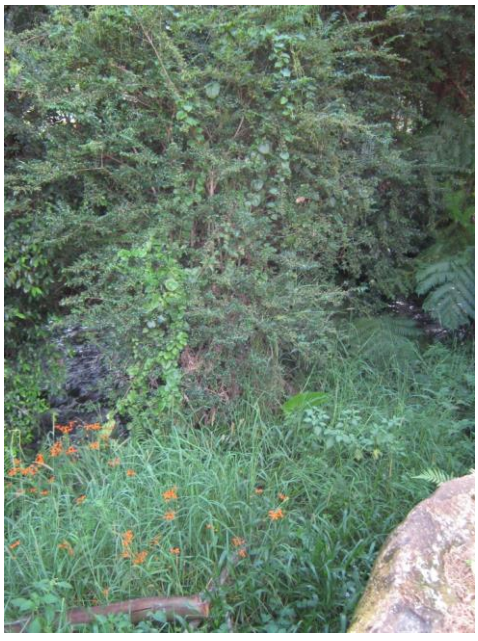

Plate 12. Examples of serious environmental weeds in zone 6 riparian vegetation.

Figure 4: Bulwinkel Park and Surrounds Southern Zones

3.2.7 Zone 7

Zone 7 is located upstream of zone 5 and is bounded by Maguires Creek and Alstonville High School. Zone 7 is dominated by exotic grasses and impacted by stock grazing. Environmental weed presence is minimal. The school has planted sections with koala food trees such as Swamp Mahogany (*Eucalyptus robusta*) and other trees which would not naturally occur in the area. Cattle can potentially be excluded from the zone with portable electric fencing.

Plate 13. Zone 7 planting (left), riparian vegetation (centre) and agricultural grasses (right)

3.2.8 Zone 8

Zone 8 is located upstream of zone 7 and bounded by Maguires Creek and Alstonville High School. The school has planted local rainforest trees in this zone. Exotics are present in the lower strata and are impacting natural regeneration. Some large stands of mature Camphor Laurel and Lantana are present.

Plate 2 Riparian vegetation planted along Zone 8 (left) Plate 3: (right) Lantana patch

3.2.9 Zone 9

Zone 9 is located on the southern edge of Alstonville High School. It encompasses a stormwater drain and the school carpark. Site conditions vary greatly across the zone with bitumen to the north-east in the school carpark, mature canopy rainforest trees below the carpark and planted Lomandra along the edge of the stormwater drain to Maguires Creek. The rainforest remnant has native relict species including White Booyong (*Heritiera trifoliata*). The remnant is heavily infested with Ochna and Large-leaved Privet. The stormwater drain that has been planted with Lomandra is covered in Madeira Vine.

Plate 14. (Left) Madeira Vine and exotic grasses located in the storm water drain. (Right) Large-leaved Privet and Ochna located under native canopy in small remnant between high school and retirement village.

3.2.10 Zone 10

Zone 10 is located upstream of zone and is bounded by Maguires Creek and Maple Drive. This zone is dominated by exotics in all strata. Camphor Laurels are most common in the canopyalong with Slash Pine (*Pinus elliottii*), Large-leaved Privet and Jacaranda (*Jacaranda mimosifolia*). A huge diversity of exotics are present in the lower strata but the most dominant weed species in the zone is Lantana.

Plate 15. Extensive area of environmental weeds in zone 10. Camphor dominated canopy (left), Lantana patch (right) .

3.2.11 Zone 11

Zone 11 is located on a pathway on the southern edge of the rainforest remnant in zone 9 and adjoins Coral Street. The area features a footpath and open grassed areas some good quality native remnant vegetation. On the edge of the path in the south of the zone, a mature rare and threatened species, Veiny Laceflower (*Archidendron muellerianum*) is located. The neighbouring property to the west has planted exotics that are encroaching in this zone. There is evidence of garden waste dumping from surrounding areas. An open grassy area in the middle of the zone that could be planted with appropriate native rainforest trees.

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Plate 16. Southern edge of zone 11 remnant vegetation with mown area in background.

3.2.12 Zone 12

Zone 12 is located between Main Street, Cawley Close, the high school and the residential area. Vegetation includes a high diversity of native and exotic garden plantings. There is a high diversity of native trees planted including local rainforest and eucalypt species and very large and significant relict Hard Quandong (*Elaeocarpus obovatus*). Amongst garden escapees there are a number of environmental weeds including Winter Senna (*Senna pendula var glabrata*), Privet, Camphor Laurel and Trad (*Tradescantia fluminensis*). There is evidence of residents extending their exotic gardens into the reserve and dumping garden waste.

It is recommended that community consultation occurs prior to work occurring in this zone as the removal of all exotic plants could potentially aggravate neighbouring landholders who have planted some of this vegetation.

Plate 17: North Western edge of Zone 12 with planted Eucalypts, rainforest and exotics.

Plate 18. Extensive infestation of Syngonium growing over native vegetation (Left). Large remnant individual of Hard Quandong (Right).

3.3 Management Actions

Table 6 details and prioritises the implementation of restoration tasks, based on recovery potential, the urgency to arrest the problem and follow-up work requirements.

Table 6: Vegetation Management Work Plan

Vegetation Management Work Zone	**Management Actions/Method** (refer to Appendices 4, 5 & 6 for details of weed profiles and weed treatment methods)	**Priority**
Zone 1 (0.03 ha) Encompassing Ken Dunstan Memorial Park	Bush Regeneration controlling all environmental weeds. Strategic control of some naturally regenerating native vine and seedlings may be required to ensure the integrity of the Tibouchina and Callistemon memorial plantings • **Spray preparation:** Hand pull weeds around natives prior to spot spraying weeds in understorey. • **C&P or CS&P:** exotic vines and scramblers, woody weeds • **Spot spray:** Exotic seedlings • Follow up bush regeneration to control emerging weeds on a regular basis as required.	High (1)
Zone 2 (0.27ha) Including Maquires Creek riparian vegetation	Systematically control exotics from the south of the zone (park entrance) moving systematically upstream. Stem injection of Camphor Laurel *Cinnamomum camphora*) is not recommended unless funding is available for physical removal or mulching after the trees have died. • **Spray preparation:** Hand pull weeds around natives prior to spot spraying weeds in understorey. • **C&P or CS&P:** exotic vines and scramblers, woody weeds • **Spray preparation:** Hand pull weeds around natives prior to spraying • **Spray:** selective overspray to control Coral Berry and other environmental weeds as encountered • Follow up bush regeneration:	High (2)

Zone 3 (0.14ha) Open parkland	Council Managed open park grassland - No bush regeneration activities are recommended in this zone	12
Zone 4 (.05 ha) Northern side of Maguires Creek	Work should begin on the upstream end of the zone working systematically downstream. Bush regeneration should begin in the lower strata handpulling, cut ,scrape and paint and foliar spraying will be required. Stem injection of canopy trees should be avoided until native trees are ready to take the place of the exotics that will controlled in the canopy 1. **Handpull** smaller woody weeds and environmental weed seedlings • **Spray preparation:** Hand pull weeds around natives prior to spraying • **Spot spray /overspray** to control environmental weeds as encountered • **CS&P or Cut and Paint** vine weeds and woody weeds • **Strategically Stem inject canopy trees** 2. Follow up bush regeneration to control emerging weeds on a regular basis as required.	High (3)
Zone 5 (0.31ha) Upstream and bounded by Maguires Creek	Weed control should begin in the downstream section of the zones systematically moving upstream. Work should begin in the lower strata with cut, scrape and paint, stem injection, splatter gun and foliar spraying. Once the lower strata have stabilised strategic stem injection of the canopy should occur. With the low presence of native trees in this zone is recommended that planting is undertaken with local rainforest trees following weed control. 3. **Handpull** smaller woody weeds and environmental weed seedlings • **Spray preparation:** Hand pull weeds around natives prior to spraying • **Spot spray /overspray** to control environmental weeds as encountered • **CS&P or Cut and Paint** vine weeds and woody weeds • **Splatter** Larger infestations of Lantana • **Strategically Stem inject** canopy trees • **Plant** with local native species (Appendix 5 lists recommended species) • Follow up weed control to ensure successful establishment of planting and any naturally regenerating native plants.	Low (10)

Zone 6 (0.05ha) Downstream of Bulwinkel Park on the northern bank of Maguires Creek	Weed control should begin in the upstream end working systemically downstream through scrape and painting of madeira, CSP privet and other woody weeds and foliar spraying any other exotics present. Once exotics have been controlled this zone should be planted with native rainforest trees and Creek Matrush (*Lomandra hystrix*) to stabilise the creek bank. 4. **Handpull** smaller woody weeds and environmental weed seedlings • **Spray preparation:** Hand pull weeds around natives prior to spraying • **Spot spray /overspray** to control environmental weeds as encountered • **CS&P or Cut and Paint** vine weeds and woody weeds • **Plant** with local native species (Appendix 5 lists recommended species) • Follow up weed control to ensure successful establishment of planting and any naturally regenerating native plants.	Low (8)
Zone 7 (0.58ha) Bounded by Maguires Creek and Alstonville High School.	Work should begin upstream moving systematically downstream It is recommended that cattle are excluded from the zone with portable electric fencing and suitable local rainforest trees planted. • **Spot spray /overspray** to control exotic grasses and environmental weeds as encountered • **Plant** with local native species (Appendix 5 lists recommended species) • Follow up weed control to ensure successful establishment of planting and any naturally regenerating native plants.	Low (7)
Zone 8 (.38ha) Bounded by Maguires Creek and Alstonville High School.	Begin work upstream of the zone systematically moving downstream. Work should begin in the lower strata with cut, scrape and paint, stem injection, splatter gun and foliar spraying. Once the lower strata have stabilised strategic stem injection of the canopy should occur. Where large gaps in previous plantings occur further plantings should consolidate previous efforts. • **Spray preparation:** Hand pull weeds around natives prior to spraying • **Spot spray /overspray** to control environmental weeds as encountered • **CS&P or Cut and Paint** vine weeds and woody weeds • **Splatter** Larger infestations of Lantana • **Strategically Stem inject** canopy trees • **Plant** with local native species (Appendix 5 lists recommended species)	Medium (6)

	• Follow up weed control to ensure successful establishment of planting and any naturally regenerating native plants.	
Zone 9 (0.21ha) Southern edge of the High School to the school carpark.	Weed control should begin in the lower strata. Once the lower strata has stabilised strategic stem injection of canopy weeds can occur. Control weeds in the storm water section of the zone below the remnant should start at the eastern end working downhill (west). Follow up weed control should be implemented regularly to ensure exotics do not have a chance to reproduce. Further planting of Lomandra would reduce the need to maintain the area frequently. • **Spray preparation:** Hand pull weeds around natives prior to spraying • **Spot spray /overspray** to control environmental weeds in the remnant and as encountered • **CS&P or Cut and Paint** vine weeds and woody weeds • **Stem inject** larger woody weeds • **Strategically Stem inject** canopy trees in the remnant • Follow up weed control to ensure successful establishment of any plantings undertaken and any naturally regenerating native plants.	Medium (4)
Zone 10 (1.74ha) Bounded by Maguires Creek and Maple Drive	Weed control should begin in the north of the zone and continue systematically south. Begin in the lower strata. Once the lower strata has stabilised strategic stem injection of Canopy weeds can occur to allow light to regenerating natives free up the existing native canopy trees. • **Spray preparation:** Hand pull weeds around natives prior to spraying • **Spot spray /overspray** to control environmental weeds as encountered • **CS&P or Cut and Paint** vine weeds and woody weeds • **Splatter** Larger infestations of Lantana • **Strategically Stem inject** canopy trees • Follow up weed control to ensure successful establishment of any plantings undertaken and any naturally regenerating native plants.	Low (11)

Zone 11 (0.1ha) Bounded by Southern edge of Zone 9 and Coral Street.	Begin weed control in the south of the zone and work to the edge of the northern remnant. Work should begin in the lower strata. Once the lower strata have stabilised strategic stem injection of the canopy can occur. • **Spray preparation:** Hand pull weeds around natives prior to spraying • **Spot spray /overspray** to control environmental weeds as encountered • **CS&P or Cut and Paint** vine weeds and woody weeds • **Strategically Stem inject** canopy trees • **Plant** with local native species (Appendix 5 lists recommended species) • Follow up weed control to ensure successful establishment of planting and any naturally regenerating native plants.	Medium (5)
Zone 12 (.38ha) Bounded by Main Street and Cawley Close , between the high school and residential area.	Community consultation prior to work occurring in this zone. As a priority, environmental weeds should be controlled first working from the north of the zone in a southerly direction. Garden exotics that are showing low chance of becoming a threat of reproducing / spreading can be retained but exotics such as (*Syngonium podophyllum*) that are invasive should be controlled. • **Spray preparation:** Hand pull weeds around natives prior to spraying • **Spot spray /overspray** to control environmental weeds as encountered • **CS&P or Cut and Paint** vine weeds and woody weeds • **Stem inject** larger woody weeds • Follow up weed control	Low (9)

4 LEGISLATION

4.1 Threatened Species

The objective of the *Threatened Species Conservation Act 1995* is to conserve threatened species, populations and ecological communities of native animals and plants (NSW NPWS 2002). The TSC Act provides for:

- the protection of all threatened plants and animals native to NSW (excluding fish and marine vegetation):
- the preparation of recovery and management strategies
- the preparation of threat abatement plans for the management of key threatening processes
- the designation of areas as critical habitat for threatened species, populations and ecological communities, and
- the consideration of threatened species in development control and environmental planning.

Prior to works undertaken in the vicinity of threatened species the *National Parks and Wildlife Act 1974* (NPW Act) requires approval of a Section 132C licence (Application for a scientific licence for the purpose of science, education or conservation). A NSW NPWS *Checklist for Bush Regeneration Activities in the Habitat of Threatened Species, Endangered Populations and Endangered Ecological Communities* should also be completed.

4.2 Chemical Use

Use of chemicals such as herbicides and their additives must only be carried out by personnel who hold current chemical users certificates. These chemicals must be used in accordance with label directions unless an off-label use permit is procured from the APVMA (Australian Pesticides and Veterinary Medicines Authority). Chemical use records must also be kept for conditions, areas treated, amounts used and application rates in accordance with the NSW *Pesticides Act 1999*.

Bush regeneration contractors are required to comply with the requirements of the *Work Health and Safety Act*.

4.3 Bush Regeneration Contractor Requirements

Contractors engaged to implement restoration works are required to have qualifications in the field of bush regeneration. Minimum qualifications and experience to undertake on-ground restoration works should comprise Certificate II in Conservation Land Management (Natural Area Restoration) or equivalent and 2 years experience working in the vegetation type(s) at the site. Bush regenerators are to hold a current Chemical Users Certificate and other relevant legislative requirements e.g. Section 132C licence to work in the habitat of threatened species.

4.4 Volunteer Requirements

Ballina Shire Council recognises the effort put in by community volunteer groups in the shire. Landcare and Dunecare work provides a range of environmental, social, educational and economic benefits. Involvement of community volunteers on Council land aims to promote best practice ecological management of natural areas within the shire. Volunteer requirements when working on Council land include;

- Implementing on-ground work in line with the site restoration plan,
- Maintaining records required by Council including bush regeneration daily record sheers and submitting then to council
- Holding appropriate public liability insurance for the group,
- Adherence with relevant legislation, policies and procedures,
- Commitment to carry out their duties in a safe and responsible way,
- Cooperation with Council staff and other volunteers as appropriate,
- Notification of Council of any activities proposed to be undertaken,
- Follow the directions of Council staff,
- Risk assessment is undertaken,

5 MONITORING & EVALUATION

Monitoring is recording and measuring the state of a community and associated natural resource management practices. Evaluation is a linked but distinct process which analyses monitoring data to assess the efficacy of a natural resource management project.

It is important to record, monitor and evaluate the progress of any rehabilitation project. This is necessary to demonstrate the outcomes achieved from the work carried out and the relative success or otherwise of different methods that have been used. Monitoring and evaluation (M&E) provides the information required to learn from experience and improve on methods thereby facilitating adaptive natural resource management.

Key areas for evaluation of rehabilitation works and examples of associated indicators include:

- Weed control outcomes (changes over time of number of weed species, density/cover of priority weeds; cost/hectare of weed control),
- Improvements in vegetation structure (changes over time in the size of the largest stems and % cover and abundance of both native and weed species; number and height range of strata within a vegetation community),
- Floristic changes (changes over time in species diversity and composition including recruitment),
- Fauna usage and habitat enhancement (changes over time in the presence and abundance of fauna species /specific habitat attributes/resources), and

Relevant performance indicators should be monitored by recording field data. This can then be supported by a photographic record.

5.1 Recording field data using photopoints

Field data is recorded using measurements that record progress and outcomes with qualitative and quantitative data which can be analysed to show problems or progress.
Data recorded will include:

- Total plant cover % Native Plant cover % and Exotic Plant Cover % for different strata
- Dominant (top 3) species present % cover and /or abundance for each stratum for both native and exotic species.
- Other information may be recorded if relevant

If a threatened flora or fauna species is found the location will be recorded and reported to the Office of Environment and Heritage, Department of Premier and Cabinet, to contribute to knowledge of species distribution.

5.2 Monitoring bush regeneration activities

Regeneration daily record sheets record work undertaken, methods, chemical usage, weather details and field observations. This information can be evaluated to guide effective future bush regeneration strategies. Copies of all record work sheets from contractors and volunteers are to be supplied to Ballina Shire Council for record keeping.

Another important aspect of monitoring is maintaining species lists. The flora and weed lists in this plan should be continually updated as new species are encountered. It is also useful to establish a fauna species list for the site, particularly as the site provides habitat for a threatened species. Any new information should be shared with land managers including local council and the Office of Environment and Heritage, Department of Premier and

Cabinet.

The management strategies and actions detailed in this plan are intended to provide a basis for the successful establishment of local native plant communities resembling those existing on the site prior to European settlement. It is important the plan implementation takes into consideration changing site conditions. Regular monitoring will provide feedback on the success or failure of management strategies and allow adaptation of the rehabilitation techniques and implementation schedule to achieve maximum effectiveness in weed control and successful restoration.

6 CONCLUSION

The strategies and recommendations detailed in this plan provide a basis for the strategic restoration of lowland rainforest at Bulwinkel Park. Systematic control of weeds will contribute significantly to improving the health of native vegetation. Planting local rainforest species in area of low natural resilience will enhance the area from an environmental and aesthetic perspective. Restoration of the native vegetation at Bulwinkel Park will improve habitat for native plants and animals and provide environmental benefits well into the future.

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APPENDIX 1: Native Plant List

The majority of species provided in this list have been planted in Bulwinkel Park

Native Plant Species Bulwinkel Park	
Scientific Name	**Common Name**
Acacia melanoxylon	Black Wattle
Acmena ingens	Red Apple
Agathis robusta	Kauri Pine
Alocasia brisbanenesis	Cunjevoi
Alphitonia excelsa	Red Ash
Alpinia caerulea	Native Ginger
Araucaria cunninghamii	Hoop Pine
Archidendron muellerianum	Veiny Laceflower
Archontophenix cunninghamiana	Bangalow palm
Argyrodendron actinophyllum	Black Booyong
Argyrodendron trifoliolatum	White Booyong
Asplenium australasicum	Crows Nest Fern
Beach Alectryon	Beach Alectryon
Brachychiton acerifolius	Flame Tree
Callerya australis	Native Wisteria
Callistemon salignus	White Bottlebrush
Capparis arborea	Brush Caper Berry
Castanospermum australe	Blackbean
Casuarina cunninghamiana	River She-oak
Ceratopetalum apetalum	Coachwood
Commelina cyanea	Blue Commelina
Commersonia bartramia	Brown Kurrajong
Cordyline petiolaris	Broad-leaved Palm Lily
Cordyline rubra	Red-fruited Palm Lily
Cordyline rubra	Palm Lily
Cordyline stricta	Narrow-leaved Palm Lily
Corymbia intermedia	Pink Bloodwood
Cryptocarya obovate	Peperberry
Cupaniopsis anacardioides	Tuckeroo
Cyanthea cooperi	Tree Fern
Dainella caerulea	Dianella
Diospyros pentamera	Myrtle Ebony
Diploglottis australis	Brown Tamarind
Dysoxylum muellei	Red Bean
Elaeocarpus angustifolius	Blue Quandong
Elaeocarpus eumundi	Hard Quondong
Eucalyptus robusta	Swamp Mahogany
Ficus coronate	Creek Sandpaper Fig
Ficus obliqua	Small leaved fig
Ficus Watkinsiana	Strangler Fig
Flindersia australe	Teak
Geissois benthamiana	Red Carrabeen
Geitonoplesium cymosum	Scrambling Lily
Glochidion sumatranum	Umbrella Cheese Tree
Glochidion ferdinandi	Cheese Tree
Grevillea robusta	Silky Oak
Guioa semiglauca	Guioa
Harpullia pendula	Tulipwood

Hicksbeachia pinnatifolia #	Red Bopple Nut
Hymenosporum flavum	Native Frangapanni
Jagera pseudorhus	Foambark
Lephostemon confertus	Swamp Box
Lepiderema pulchella #	Fine Leaved Tuckeroo
Litsea australis	Brown Bollygum
Livistona australis	Cabbage tree palm
Lophostemon confertus	Brush Box
Maclura cochinchinensis	Cockspur
Mallotus phillippensis	Red Kamala
Marsdenia rostrate	Milk Vine
Melaleuca quinquenervia	Paperbark
Melia azedarach	White Cedar
Melicope elleryana	Doughwood
Mellicope elleryana	Pink Euodia
Miachocarpus pyriformis	Yellow Pear Fruit
Oplemenus aemulus	Basket Grass
Persicaria decipiens	Slender knotweed
Persicaria strigosa	Spotted Knotweed
Pittosporum undulatum	Sweet Pittosporum
Planchonella australis	Black Apple
Plectranthus parviflorus	Cockspur Flower
Podocarpus elatus	Podocarpus
Rhodamnia rubescens	Scrub Turpentine
Rhodosphaera rhodanthema	Yellowwood
Rubusrosifolius	Native raspberry
Sarcopteryx stipata	Steelwood
Sloanea australis	Maiden's Blush
Sloanea woollsii	Yellow Carrabeen
Stenocarpus sinuatus	Firewheel
Synoum glanulosum	Scentless Rosewood
Syzygium leuhmannii	Small-leaved Lilly Pilly
Syzygium moorei #	Coolamon
Syzygium oleosum	Blue Lilly Pilly
Toona ciliata	Red Cedar
Trophis scandens	Burny Vine
Waterhousia floribunda	Weeping Lilly Pilly
Wilkiea huegeliana	Veiny Wilkea

APPENDIX 2: Weed Profiles

Trees and Shrubs

Archontophoenix alexandrae
Alexander Palm
Arecaceae
Solitary palm, the trunk is enlarged at the base, rings relatively close together, pinnate leaves arching at the top forming a crown usually greyish on the lower surface. Old leaves are shed regularly. Fruit orange to red 1-1.5 cm long

Eugenia uniflora
Brazilian Cherry
Myrtaceae
Native of Brazil. A broad, compact shrub with deep green, glossy foliage with rich wine-coloured new growth. Crushed leaves have a pungent, agreeable odour. Fruit is 2.5 cm. in diameter, deep crimson, fleshy and readily dispersed by birds (Popenoe, 1974, 286).

Diospyros nigra
Black Sepote
Ebenanceae
A species of persimmon that is native to eastern Mexico and Central America south to Colombia. Other names include Chocolate Pudding Fruit, Chocolate Persimmon. Mature trees can grow to over 25 m (82 ft) in height. lack Sapote fruit are tomato-like and measure 5–10 cm (2.0–3.9 in) in diameter, with an inedible skin that turns from olive to a deep yellow-green when ripe and a pulp which is white and inedible when unripe but assumes a flavor, color and texture often likened to chocolate pudding when ripe. Fruits usually contain seeds, up to a maximum of 12.

Celtis australis
Chinese Celtis
Cannabaceae
Medium-sized deciduous tree. Often cultivated and naturalised in Northern Rivers. Native of Africa (Harden, 1990).

Cestrum Nocturnum
Night Flowering Cestrum
Solanaceae
Large shrub or small tree to 4 m high. Cultivated, sparingly naturalized in Maitland district. Native of Antilles & C Amer.

Citrus X taitensis
Bush lemon
Rutaceae
Tangled shrub or small tree to c. 6 m high, with stiff, stout axillary spines paired, 2.5–30 mm long

Cinnamomum camphora
Camphor Laurel
Lauraceae
Native of China and Japan. A large tree of spreading habit that can grow to approximately 25-30 metres. It has abundant seed production, effective dispersal mechanism, mainly by birds, and some seed dormancy. It is a hardy, long-living competitive tree which can also reproduce rapidly by suckering to form single species stands. Camphor Laurel prefers deep, well-drained red soil but will grow well on alluvial soil; it cannot, however, tolerate prolonged

flooding (Firth, 1992, p.69). It is extensively naturalized in coastal areas on the North Coast of NSW (Harden, 1990, p.144). It is a declared W4(d) noxious weed (i.e. must not be sold, propagated or knowingly distributed and must be fully and continuously suppressed and destroyed).

Coffea arabica
Coffee
Rubiaceae
Shrub to small tree. Prefers deep, free-draining soils; very shade tolerant; prefers dappled light. Flowers are white, fragrant star-shaped; autumn. Fruit is red when ripe; seed viable up to three years; late autumn - spring. Fruits are dispersed by birds, rodents and water (The Big Scrub Rainforest Landcare Group, 2000).

Corymbia torelliana
Cadagi
Myrtaceae
Native of rainforest and rainforest margins in northern Queensland.
Tree to 30 m high. Leaves with lateral veins at wide angle to midvein and with vein near leaf margin, small visible glands present. Fruit 8–10 mm long and wide. Seeds red-brown, small. Distinguished by rough grey to black fibrous bark on the lower trunk and smooth and green above. www.weeds.org.au/

Eriobotrya japonica
Loquat
Rosaceae
Small to medium tree, preferring sunny positions, found alongside roadsides, forest margins, fence lines, gaps in rainforest and in regrowth (The Big Scrub Rainforest Landcare Group, 2000). Flowers are white, flowering in autumn, with the fruit maturing in the following spring (Harden, 1990 Vol. 1). Fruits are dispersed by birds, rodents, bats, possums and people (The Big Scrub Rainforest Landcare Group, 2000). The plant germinates readily from seed, roots tap and lateral

Jacaranda mimosifolia
Jacaranda
Bignoniaceae
Native to South America. This species is also widely regarded as an environmental weed in north-eastern New South Wales. The species are shrubs to large trees ranging in size from 20 to 30 m (66 to 98 ft) tall. The leaves are bipinnate in most species, pinnate or simple in a few species. The flowers are produced in conspicuous large panicles, each flower with a five-lobed blue to purple-blue corolla; a few species have white flowers. The fruit is an oblong to oval flattened capsule containing numerous slender seeds.

Lantana camara
Lantana
Verbenaceae
Native of tropical South America. A scrambling shrub that often forms dense thickets (Harden, 1992, p.614) and can climb over 20 metres into trees. It grows best on well-drained, fertile soils including nutrient-enriched sands; roots also develop on branches that contact the ground, aiding its spread. It produces abundant seed, which is effectively dispersed by birds. According to Richard Lamb of Sydney University, when Lantana is present, particularly in sclerophyll communities, litter fall and nutrient turnover is altered, populations of native seeds are depleted, new seedlings are suppressed, soil structure is altered and micro-climate is changed, and some nutrients may be mobilized and lost to neighbouring communities and others accumulated in unnatural amounts. These changed conditions seem to further favour Lantana and other weeds over native species (Buchanan, 1989, p.72) and in many forest areas can block secondary succession. It is a declared Class 3 noxious weed

(i.e. must be prevented from spreading and its numbers reduced) and weed of national significance (WONS).

Ligustrum lucidum
Large-leaf Privet
Oleaceae
Native of China and Japan. A shrub to small tree up to 10 metres high which is an invasive weed, especially of coastal rainforests (Harden, 1992, 473). It is adapted to low light levels, coppices readily when damaged and has a mass of fibrous roots near the surface of the ground, these roots efficiently utilise the available moisture and nutrients in the soil to the detriment of any nearby plant. Each mature plant can produce from 10,000 to 100,000.00 seeds, which have a 1-2 year viability and are effectively spread by birds (Buchanan, 1989, 67-68).

Ligustrum. sinense
Small-leaved Privet
Oleaceae
Native of China a shrub to about 3 metres high. An invasive weed, especially on the margins of rainforest (Harden, 1992, 471). It is adapted to low light levels, coppices and suckers readily and has a mass of fibrous roots near the surface of the ground. These roots efficiently utilize the available moisture and nutrients in the soil to the detriment of any nearby plant. It can form thickets within the forest. Each plant can produce approximately 600 seedlings per square metre and seeds are effectively dispersed by birds (Buchanan, 1989, 67).

Murraya paniculata
Orange Jessamine
Rutaceae
Bushy shrub to small tree. Prefers well drained fertile soils, found in dry rainforests and in lowland subtropical rainforests on alluvial soils. Flowers are white, fragment, and flower in spring, with autumn flush. Fruit/seeds are bright red, shiny; seed: dull yellowish-grey; chiefly summer. Fruits/seeds are dispersed by birds, water, and human activities. Germinates easily from seed (The Big Scrub Rainforest Landcare Group, 2000).

Psidium guajava
Guava
Myrtaceae
A shrub or small tree up to 6 metres high (Harden, 1991, 192). Its fleshy berries are attractive to birds which disperse the seed. It is resistant to glyphosate

Senna pendula var. glabrata
Winter Senna
Caesalpiniaceae
Native of South America. A spreading shrub to three metres high widely naturalized in coastal areas. It produces a large number of seeds, which have a long viability and are spread by water, ants, rodents and birds. It can also regenerate from cut material in moist conditions. Flowers Easter time in Northern NSW.

Solanum mauritianum
Wild Tobacco
Solanaceae
A shrub or small tree up to 4 metres high, widely naturalized in rainforest regrowth (Harden, 1992, 359). Its fruit are dispersed by birds. In areas of higher light levels it can form thick stands displacing native species by competing for water, space and nutrients

Syagrus romanzoffianum
Cocos Palm
Arecaceae
Native of Brazil. A tall palm growing to 12 metres. Its fleshy fruit is dispersed by birds, rodents and water. Fruit is also eaten and dispersed by flying foxes (Eby and Palmer, 1988, 53).

Vines and Scramblers

Anredera cordifolia
Madeira Vine
Basellaceae
Native of S. America. A climber with stems up to 20 metres long, producing tubers on roots and at nodes on aerial stems. It is widely naturalized in coastal districts, and is an invasive weed on the margins of rainforest (Harden, 1990, 177). This vine is extremely prolific, growing over 1 metre per week in warm, humid conditions. It produces countless vegetative aerial tubers which drop to the ground and remain dormant if conditions are not suitable for their growth. These tubers are spread by water, downhill movement and possibly rodents. The vine will rapidly smother plants of all sizes, destroying them through weight and inhibition of photosynthesis, and can block secondary succession (Hopkins). It is extremely difficult to control and is considered to be the most serious and destructive plant pest species affecting the North Coast rainforest remnants.

Delairea odorata
Cape Ivy
Asteraceae
Twining perennial, with slender ± succulent stems to 3 m long, glabrous. Flowering chiefly winter. Weed in moist gullies; chiefly in coastal districts, south from Brunswick Heads (PlantNet FloraOnline, 2012)

Desmodium uncinatum
Silverleaf desmodium
Faboideae
Native of South America, Prostrate to scrambling herb with stems to several metres long. Leaf stalk 1.5–6 cm long. Seedpod flattened, 1–3 cm long, 0.15–0.3 cm wide, with 3–10 seeds. Seeds pale brown to tan, elliptic, 3–3.5 mm long. Spread by seed. Introduced as a pasture species. Often naturalised alongside roads in coastal areas of northern NSW and south-eastern Queensland.
ww.weeds.org.au

Callisia repens
Turtle vine
Commelinaceae
Native to Mexico . A creeping herbaceous plant with clusters of large, green or purplish, fleshy leaves. Its fleshy spreading stems produce roots and give rise to new plants. Its flowers are borne in clusters at the top of long upright stalks. Its small flowers are almost stalkless and have white petals.
http://weeds.brisbane.qld.gov.au/weeds/purple-succulent

Tradescantia fluminensis (albiflora)
Wandering Jew
Commelinaceae
Native of S. America. A perennial succulent herb with fibrous roots and branching stems which readily take root at the nodes. It is naturalised on creek banks and in shaded places,

especially rainforests (Harden, 1993, 257). Its resistance to herbicide and its growth habit make this plant difficult to eradicate. This dense groundcover suppresses the germination and growth of native species, thereby blocking secondary succession. It has been observed, however, that those species whose seed is large can penetrate and grow well e.g. Black Bean.

Dolichandra unguis-cati
Cats Claw Creeper
Bignoniaceae
Native of South America, Sends runners across the ground until a suitable trellis is reached then becomes a vigorous woody climber. Develops a system of large underground tubers. Trifoliolate leaf, attaches to host by modified middle leaflet acting as tendril. Flowers bright yellow, showy. Fruit a long pod packed with windborne seeds

Passiflora. suberosa
Corky Passionfruit
Passifloraceae
Native of S. America. A slender vine with corky stems occasionally naturalized in disturbed rainforest in warmer areas (Harden, 1990, 435). Its foliage cover inhibits photosynthesis of supporting plants, which can also be damaged by its weight. Its seed is dispersed by birds and animals.

Passiflora subpeltata
White Passionflower
Passifloraceae
Native of Brazil. A climber which is a widespread weed along the coast on margins of rainforest and moist gullies (Harden, 1990, 435). Its foliage cover inhibits photosynthesis of supporting plants, which can also be damaged by its weight. Its seed is dispersed by birds and animals.

Passiflora edulis
Edible Passionfruit
Passifloraceae
Native of America. A climber which is often naturalized on the edge of rainforest and moist gullies (Harden, 1990, 434). This plant bears heavy fruit whose seeds are readily dispersed by birds and animals. Its foliage cover inhibits photosynthesis of supporting plants, which can also be damaged

Solanum seaforthianum
Climbing Nightshade
Solanaceae
Native of S. America. Sprawling perennial shrub or climber, naturalized in moister sites (Harden, 1992, 359). Like other vines, it causes stress on the support plant by its smothering action and weight. Its red berries are dispersed by birds.

Herbs, Ferns and Grasses

Ageratina riparia
Mistflower
Asteraceae
Native of Mexico. Erect, perennial, sometimes decumbent herb, 0.3-1 metres high. Grows in disturbed damp sites, often in or near rainforests (Harden, 1992, 151). Its seeds are dispersed mainly by wind, and vegetative fragments can carry downstream. It can form a dense cover, inhibiting and sometimes preventing natural native regeneration. A declared Class 3 noxious weed in the Far North Coast of N.S.W. (see a. adenophora).

Ageratum houstonianum
Blue Billy Goat Weed
Asteraceae
Native of Mexico. Common weed of wasteland north of Sydney. Erect or decumbent branched herb, 0.3-1 metre high, coarsely hairy or nearly glabrous. Leaves ovate to triangular, two to seven centimetres long. Margins are regularly toothed and both surfaces have scattered hairs. Florets are blue-mauve (Harden, 1992, p.150).

Ambrosia artemisiifolia
Ragweed
Native of N. America. An annual herb to 2 metres high, a weed of roadsides and wastelands (Harden, 1992, 268).

Bidens pilosa
Farmers Friends/Cobbler's Pegs
Asteraceae
Native of Mexico. Common weed of wasteland north of Sydney. Erect or decumbent branched herb, 0.3-1 metre high, coarsely hairy or nearly glabrous. Leaves ovate to triangular, two to seven centimetres long. Margins are regularly toothed and both surfaces have scattered hairs. Florets are blue-mauve (Harden, 1992, p.150).

Colocasia esculenta
Taro
Araceae
A variable species of perennial herb 1-2 m tall; large "elephants ears" leaves grow from the base, upper surface glossy green to bluish-black. Occurs in many variants.

Conyza sumatrensis
Tall Fleabane
Asteraceae
Robust, erect annual herb to 2 m flowering chiefly Dec.–Aug.
Weed of cultivation, pasture and wasteland; widespread, west to the Deniliquin area. Native of N America.

Nephrolepis cordifolia
Fishbone Fern
Davalliaceae
A fern that colonises large areas through rhizomes, and stolons which bear reproductive tubers (Harden, 1990, 63). Bright green foliage resembles the skeleton of a fish. Can be mistaken for the desirable Blechnum nudum (Fishbone Water Fern).
Although a native of N.S.W (north of the Clarence River), it is often cultivated and has naturalised near habitation. It is considered a weed in many situations (Floyd, pers. comm.).

Solanum nigrum
Blackberry Nightshade
Solanaceae
Native of Europe, Asia and northern Africa. Ariable bushy annual or short-lived perennial herb to 80 cm high Stems green to purple. Berries globeshaped, green at first but maturing dull black to purple-black.

Paspalum madiocanum
Broad-leaved Paspalum
Poaceae
A tufted perennial grass growing to 1 m tall, but usually less than 50 cm in height. Cultivated as a pasture grass it has been proposed as a potential groundcover for sub-tropical

orchards. A weed of roadsides, waste areas, disturbed sites, pastures, riparian areas and moist forests in wetter tropical, sub-tropical and warmer temperate regions. It is regarded as an environmental weed in Queensland and New South Wales. This species grows in a wide range of conditions, from full sun to shaded sites, and suppresses or kills grasses and other species in the ground layer of vegetation. Because it grows well in heavy shade under a dense tree canopy, and is particularly invasive in wetter forest and rainforest communities. Native to southern South America.

Rumex crispus
Curly Dock
Polygonaceae
Erect plants, usually with long tap roots. The fleshy to leathery leaves form a basal rosette at the root The flowers and seeds grow on long clusters at the top of a stalk emerging from the basal rosette; in many species the flowers are green, but in some (such as sheep's sorrel, Rumex acetosella) the flowers and their stems may be brick-red. Each seed is a 3-sided achene, often with a round tubercle on one or all three sides.

Setaria sphacelata
Setaria
Poaceae
Cultivated as a pasture grass and naturalised. Native of Sth Africa . Densely to compactly tufted perennial to 2 m high. (www.plantnet.rbgsyd.nsw.gov.au)

Melinus repens
Red Natal Grass
Poaceae
A native of South America the grass is a perennial or annual with erect slender stems up to 1m high. Flowers are a panicle of silvery white to pink or purple silky, hairy spikelet. M. ripens is a widespread roadside and railway embankment weed, particularly in coastal NSW and Qld. (Auld & Medd, 1999).

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APPENDIX 3: Weed Control Techniques

CUT-SCRAPE-PAINT

This method applies to small trees, woody shrubs and some vines.

- Cut plant low to the ground (approx 1–2 cm above soil level) and at a slight angle.
- Apply herbicide immediately at the rate of **1 part Glyphosate: 1.5 parts water** with a paintbrush approximately 1.5cm wide.
- Scrape all sides of the remaining stump lightly to reveal green tissues and apply the herbicide to the scraped area. Take care that the brush is not contaminated with soil.

Note: All seed that has high viability and longevity should be removed from the parent and either composted on site or removed from the site such as Senna spp. and other members of the Fabaceae family. Larger trunks should be scraped and painted in sections as cells quickly shut down once exposed preventing the translocation of herbicide.

Scrape and paint method

This method is applicable to vine species where it is desirable to treat the vines intact, particularly those with aerial tubers such as Madeira Vine or those which will propagate from segments such as Cape Ivy.

- **DO NOT CUT STEM**, where possible remove and bag tubers before scraping to avoid dislodging them during treatment.
- Scrape the stem tissue on **one side of the stem only** for up to 50cm if possible.
- With a paintbrush, apply **Glyphosate / Metsulfuron-Methyl mix, at the rate of 1gr Metsulfuron-Methyl mixed in 1 litre of water, then mixed 1:1.5 with Glyphosate,** within 7 seconds of scraping the stem, ie. scrape and paint in sections
- Leave a 5cm gap, rotate stem and repeat. Scrape and paint as much of the stem as possible.

Note: With Madeira Vine, it is necessary to scrape heavily into pithy centre of stem. It is essential that ground tubers and lateral roots are also treated with a heavy scrape and paint. If the tuber is of substantial size a ditch can be made into the tuber with a knife and apply herbicide mix. Any side roots must also be scraped and painted.

FOLIAR SPRAYING

This is carried out using a 15 litre backpack spray unit with a modified spray nozzle that gives an accurate and easily adjustable spray pattern eg. Rega®. Glyphosate and Metsulfuron-Methyl are the herbicides commonly used, with the addition of a marker dye.

Common Dilution Rates:

- Lantana and Cats Claw Creeper and other soft leaved plants, annuals and grasses, **Glyphosate 1:100 water + adjuvant** .
- Plants with more or less succulent leaves eg. *Madeira Vine* Glyphosate **1:50 + 1.5gr Metsulfuron-Methyl per 10 litres water + adjuvant.**
- Bitou Bush, **Glyphosate 1:150 - 1:400 water + adjuvant.**

Note: Autumn to winter is the optimum time for spraying Madeira Vine, Trad, Asparagus spp. Weaker solutions are most effective in the winter months for Bitou Bush.

Overspray method

This method is applicable to large, dense infestations of such plants as Bitou Bush and Lantana. It may be used where it is desirable to leave dead plants intact to prevent erosion and over exposure of large areas, to protect native seedlings from predators such as wallabies and to avoid trampling by humans.

- Spray over the top of the infestation using selected solution of Glyphosate or Metsulfuron-Methyl.

Note: Any native plants that may be under the weed will be protected by the foliage cover of the weed.

Leave the sprayed plants intact so that native seedlings can establish under the shelter provided.

Alternatively, weed infestation can be cut and flattened with brush hooks or loppers and the subsequent regrowth sprayed with Glyphosate or Metsulfuron-Methyl.

Spot spray method

This method is used commonly in the maintenance phase to control smaller individual weeds which have germinated since primary and follow up works.

- Great care needs to be taken to avoid spraying desirable native seedlings.
- Good plant identification skills are required to recognise the different species encountered.
- A small water atomiser should also be carried during maintenance spraying to wash any herbicide accidentally applied to non-target species.

Note: Selective herbicides may reduce off target damage. Eg Metsulfuron-Methyl will kill broadleaf weeds, such as Mist Flower, growing over native grasses without damage to monocotyledons.

Splatter Gun or Gas Gun Technique

This technique involves low volume, high concentration application of herbicide to Lantana foliage. The technique works best on thick clumped Lantana or scattered regrowth with a compact growth form.

Only glyphosate and metsulfuron-methyl are registered for use on Lantana using this method.

For dense Lantana thickets if required, cut access tracks, apply herbicide with a splatter gun with Glyphosate 1:9 + sticker oil. Where large areas are to be treated a grid style application (perpendicular splatters over a patch) of herbicide every 1 – 1.5 m has been found to maximise the kill rate, this technique can adapted to suit the growth pattern of the Lantana.

The 5L gas gun dispenser is often used but also a 15L solo knapsack can be used when large areas are to be treated to save returning to refill equipment. This option can be used to throw the herbicide a similar distance and does not require the purchase of gas for cylinders.

STEM INJECTION

This method applies to all woody trees and shrubs with a diameter of 6 -10cm or greater.

- Using a cordless or electric drill with 8 -10mm drill bit, drill holes at 15cm intervals around the trunk of the weed tree.
- Drill down at an angle of 45 degrees and in behind or parallel to the bark, rather than straight into the heartwood, so as to maximise contact with active sapwood
- Apply herbicide immediately into the hole using a tree injecting device.
- If using **Glyphosate apply at the rate of 1:1.5** or **Glyphosate / Metsulfuron-Methyl mix, at the rate of 1gr Metsulfuron-Methyl mixed in 1 litre of water, then mixed 1:1.5 with Glyphosate**.
- Top up holes as herbicide is absorbed.
- Treat all visible lateral roots as per 1.

CROWNING

This method is applicable to weeds which have their growth points at ground level or below the surface of the ground such as corms, bulbs, rhizomes, clumped or fibrous root systems eg. Asparagus spp, Spider Plant and clumping grasses.

- Grasp the leaves or stems and hold them tightly and close to the ground so that the base of the plant is visible.
- Insert the knife close to the base of the plant at a slight angle with the tip well under the root system.
- Cut through the roots close to the base. Depending on the size of the plant two or more cuts may be needed to sever all the roots.
- Remove the plant. Make sure that the base of the plant where the roots begin is completely removed.
- Shake off excess soil and hang the plant up in a tree to prevent it from reshooting, or remove it from site.

GOUGE-and PAINT

This method applies to those plant species that have a fleshy root system such as rhizomes or large bulbs. It is particularly appropriate for the treatment of Climbing Asparagus Fern.

- Cut the stems of the plant at head height and then at ground level.
- The stems are then cut up and spread over the ground to act as part of the leaf litter.
- Gouge out sections of the fleshy base with a knife.
- Apply **Glyphosate/Metsulfuron-methyl mix, at the rate of 1gr Metsulfuron-Methyl mixed in 1 litre of water, then mixed 1:1.5 with Glyphosate** with a paintbrush approximately 1.5cm wide avoiding contact with soils.

Source: modified from Joseph, R., 2001. *Course Notes for Certificate II in Bushland Regeneration*. Wollongbar TAFE.

APPENDIX 4: Weed Control Methods

Abbreviations & Ratios for Application of Herbicide

Dilution ratios for application of a Glyphosate based herbicide (such as Round Up Biactive® or Weedmaster Duo ®) and water are provided. For example, **1:50** means that one part by volume of Glyphosate is mixed with fifty parts by volume of water. Unless specified, cut, scrape and paint at **1:1.5** refers to 1 part Glyphosate is mixed with 1.5 parts water.

Metsulfuron-Methyl (MM) is a selective herbicide and is commonly used where broad leaf weeds occur with native grasses or other monocotyledonous plants such as Lomandra sp. It is generally used in a foliar spray at the rate of **1.5gr/10 litres of water**.

For some weeds a combination of Glyphosate and Metsulfuron-Methyl Methyl is recommended, however an off-label permit will be required for this off label usage. An off-label permit must be approved by the Australian Pesticides and Veterinary Medicines Authority (APVMA).

Spray rates for Glyphosate/Metsulfuron-Methyl mix are generally **1:50** as above, with **1.5.gr** Metsulfuron-Methyl added per **10 litres**. This option is shown as Spray **GMW+ adjuvant.**

For cut, scrape, paint or stem injection of some species it is recommended to mix **1 gram Metsulfuron-Methyl** in **1 litre of water**., then mix this solution **1:1.5 with Glyphosate.** These options are shown as cut, scrape, paint **GMW** or stem inject **GMW.**

An adjuvant is a material added to a herbicide to improve its effectiveness, some herbicides have sufficient adjuvants and require no additional surfactants. Herbicides may be more effective with the addition of adjuvants which may be referred to on the herbicide label. Always read and adhere to the herbicide label.

Commonly used adjuvants include

Penetrants & surfactants (such as LI 700, Pulse & Agral) which facilitate the transfer of the herbicide through the surface tissue and is often used for plants with waxy leaves such as Madeira Vine, Camphor Laurel or Wandering Creeper.

Stickers (Such as Protec Plus and Spraytech oil) which help improve herbicide performance by increasing droplet deposition, spread and uptake by the plant.

(Big Scrub Rainforest Landcare Group, 2008)

Weed control methods

Scientific Name	Common Name	Control Method
Archontophoenix alexandrae	Alexander Palm	Spray resistant Hand pull or crown seedlings, cut larger plants below growing point. Large palms can be stem injected 1: 1.5
Celtis sinensis	Chinese Elm	Hand pull young plants, cut, scrape and paint saplings **1:1.5**, frill spear or drill trees **1:1.5**; spray regrowth *glyphosate* **1:100 + adjuvant**
Cestrum nocturnum	Night Flowering Cestrum	Cut Scrape and Paint **1.5g/L** Stem inject **1:1.5** larger trees
Cinnamomum camphora	Camphor Laurel	Spray seedlings **GMW+ adjuvant** Cut scrape and paint small plants **1:1.5** Stem inject **1:1.5** larger trees
Citrus X taitensis	Rough Lemon	Cut scrape and paint glyphosate 1:1 trees stem inject glyphosate 1:1 seedlings G200 + MM
Coffea arabica	Coffee	Cut, scrape and paint **1:1.5** (resistant to spray, requires manual control)
Corymbia torelliana	Cadagi	Spray seedlings **GMW+ adjuvant** Cut scrape and paint small plants **1:1.5** Stem inject **1:1.5** larger trees
Diospyros nigra	Black Sepote	Cut scrape and paint **1:1.5**
Eriobotrya japonica	Loquat	Cut scrape and paint **1:1.5**, trees stem inject glyphosate**1:1.5** seedlings **G200 + MM**
Eugenia uniflora	Brazilian Cherry	Cut, scrape and paint **1:1.5**; Stem inject **1:1.5** Spray *glyphosate* **1:100 + adjuvant**. Best time to spray – early autumn
Solanum nigrum	Blackberry Nightshade	Hand pull or Spray *glyphosate* **1:100**
Lantana camara	Lantana	Lopper and cut, scrape and paint base Glyphosate **1:1.5.** Foliar spray and re-growth spray Glyphosate **1:100 + adjuvant** Dense Lantana thicket: If required, cut access tracks. Overspray of all foliage Glyphosate **1:100 + adjuvant** or apply herbicide with a splatter gun with Glyphosate **1:9 + adjuvant**. The splatter gun delivers a narrow stream/splatter of herbicide which should be applied every 1 - 1.5m of bush using 2 x 2ml shots per 0.5m of bush (treat both sides of the bush)
Ligustrum lucidium	Large-Leaved Privet	Stem inject **1:1.5** larger trees. Cut, and paint **1:1.5** small plants. Spray seedlings **M M** 1.5g per 10L + **adjuvant** or *glyphosate* **1:50 + adjuvant**
Ligustrum sinense	Small-Leaved Privet	Stem inject **1:1.5** larger trees Cut and paint **1:1.5** small plants. Spray seedlings Spray seedlings **M M** 1.5g per 10L + **adjuvant** or *glyphosate* **1:50 + adjuvant** *glyphosate* **1:50 + adjuvant** For multi-stemmed specimens chainsaw and cut and paint **1:1.5**

Jacaranda mimosifolia	Jacaranda	Stem inject **1:1.5**. Remove when dead
Psidium guajava	Guava	Handpull seedlings Cut and paint or stem inject **1:1.5** *For large shrubs drilldown into cut and scraped stump to make a well and fill with the cut and paint mixture. Stem inject GMW large shrubs using a fine drill bit*
Solanum mauritianum	Tobacco Bush	Stem inject **1:1.5** larger trees Cut, scrape and paint **1:1.5** Spray seedlings *glyphosate* **1:100 + adjuvant**
Phoenix dactylifera	Date Palm	Cut below crown shaft Large palms can be stem injected 1: 1.5
Syagrus romanzoffianum	Cocos Palm	Spray resistant Hand pull or crown seedlings, cut larger plants below growing point
Vines and Scramblers		
Anredera cordifolia	Madeira Vine	Bag tubers. Do not cut the stem Scrape stem (300-500mm) on alternate sides and paint **GMW** Scrape/gouge and paint tubers **GMW** Spray ground infestations **GMW + adjuvant**. Regular follow up required
Delairia oderata	Cape Ivy	Spray *glyphosate* **1:50 + adjuvant**
Desmodium umcinatum	Silver-Leaved Desmodium	Bag seed heads, spray **1:50 + adjuvant**
Tradescantia fluminensis	Trad	Spray *glyphosate* **1:50 + adjuvant** In small areas rake and roll to carefully hand remove
Passiflora edulis	Edible Passionfruit	Usually hand pull, but on larger individuals cut, scrape and paint **1:1.5** Bag fruit Roll up vines, spray regrowth *glyphosate* **1:100 + adjuvant**
Passiflora suberosa	Corky Passionfruit	Hand pull smaller vines Cut, scrape and paint **1:1.5** Spray regrowth **GMW + adjuvant**
Passiflora subpeltata	White Passionfruit	Hand pull smaller vines Cut, scrape and paint **1:1.5**. Spray regrowth **GMW + adjuvant**
Dolichandra unguis-cati	Cats Claw Creeper	Cut, scrape and paint main stem and where each node roots 1:1.5, bag fruit. Spray regrowth *glyphosate* **1:100 + adjuvant**
Herbs Ferns and Grasses		
Ageratum houstonianum	Billygoat Weed	Spray *glyphosate* **1:100 + adjuvant, or 1.5g/10L + adjuvant** Hand pull and hang up
Ambrosia artemisifolia	Rag weed	Spray glyphosate **1:100 + adjuvant** or **1.5g/10L** when young
Bidens pilosa	Farmers Friend	Spray *glyphosate* **1:100 + adjuvant**
Ageratina riparia	Mist Weed	Spray glyphosate 1:100 + adjuvant, or 1.5g/10L + adjuvant
Ageratina adenophora	Crofton Weed	Spray *glyphosate* **1:100 + adjuvant, or 1.5g/10L + adjuvant** Hand pull and hang up

Conyza albida	Tall Fleabane	Hand remove or Spray *glyphosate* **GMW+ adjuvant**
Colocasia esculenta	Taro	Larger infestations :dig up and remove, though this can cause a large amount of soil disturbance. Foliar spray with glyphosate and water at **1:50** &/or metsulfuron methyl at **1.5g/10 L** + **adjuvant** or trial cut, scrape and paint or drill & inject rhizome with glyphosate and water **1:1.5** &/or metsulfuron methyl at **10g/1L**. Only use metsulfuron methyl in terrestrial areas. To control dense patches of the plant near waterways, trial glyphosate **1:9** (via a splatter gun) or 1:20 with a wickwiper. Use only formulas that are registered for use near waterways
Cirsium vulgare	Spear Thistle	Spray *glyphosate* **1:100 + adjuvant or MM**
Exotic grasses		Spray *glyphosate* **1:100 + adjuvant**

APPENDIX 5: Recommended species for planting

Trees

Species	Common Name
Acmena ingens	Red Apple
Acmena smithii	Common Lilly Pilly
Acronychia oblongifolia	Common Acronychia
Alphitonia excelsa	Red Ash
Aphananthe philippinensis	Native Elm
Archontophoenix cunninghamiana	Bangalow Palm
Arytera distylis	Twin-Leaved Coogera
Baloghia inophylla	Scrub Bloodwood
Brachychiton acerifolius	Flame Tree
Bridelia exaltata	Scrub Ironbark
Caldcluvia paniculosa	Soft Corkwood
Castanospermum australe	Black Bean
Castanospora alphandii	Brown Tamarind
Cinnamomum oliveri	Olivers Sassafras
Clerodendrum floribundum	Smooth Clerodendrum
Commersonia batramia	Brown Kurrajong
Cryptocarya glaucescens	Jackwood
Cryptocarya obovata	Pepperberry
Cupaniopsis flagelliformis	Brown Tuckeroo
Dendrocnide excelsa	Giant Stinging Tree
Dendrocnide photinophylla	Smooth Stinging Tree
Diospyros pentamera	Myrtle Ebony
Diploglottis australis	Native Tamarind
Dysoxylum fraserianum	Rosewood
Dysoxylum mollisimum	Red Bean
Ehretia acuminata	Koda
Elaeocarpus grandis	Blue Quandong
Elaeocarpus kirtonii	Silver Quandong
Elaeocarpus obovatus	Hard Quandong
Ellatostachys nervosa	Green Tamarind
Endiandra pubens	Hairy Walnut
Ficus coronata	Creek Sandpaper Fig
Ficus fraseri	White Sandpaper Fig
Ficus macrophylla	Moreton Bay Fig
Ficus obliqua	Small Leaved Fig
Ficus superba	Deciduos Fig
Ficus virens	White Fig
Ficus watkinsiana	Strangler Fig
Flindersia australis	Teak
Flindersia schottiana	Cudgerie
Flindersia xanthoxyla	Yellow Wood
Geissos benthamii	Red Carabeen
Glochidion ferdinandi	Cheese Tree
Guioa semiglauca	Guioa
Heritiera trifoliolata	White Booyong

Trees

Species	Common Name
Hymenospermum flavum	Native Franjipani
Litsea australis	Brown Bolly Gum
Litsea reticulata	Bolly Gum
Mallotus discolor	Yellow Kamala
Mallotus phillippensis	Red Kamala
Melia azaderach	White Cedar
Melicope octandra	Doughwood
Omalanthus populifolius	Bleeding Heart
Pentacerus australis	Crow's Ash
Pilidiostigma glabrum	Plum Myrtle
Pittosporum undulatum	Sweet Pittosporum
Planchonella australis	Black Apple
Podocarpus elatus	Plum Pine
Polyscias elegans	Celerywood
Rhodamnia argentea	Malletwood
Rhodomyrtus psidioides	Native Guava
Sarcopterix stipata	Steelwood
Sloanea australis	Maidens Bush
Sloanea woollsii	Yellow Carabeen
Stenocarpus sinuatus	Fire-wheel Tree
Streblus brunonianus	Whalebone Tree
Syzygium australe	Scrub Cherry
Syzygium crebrinerve	Purple Cherry
Syzygium francissi	Giant Water Gum
Syzygium hodkinsoniae	Red Lilly Pilly
Syzygium leuhmanni	Riberry
Syzygium moorei	Coolamon
Toechima dasyrrhache	Blunt Leaved Steelwood
Toona ciliata	Red Cedar
Trema tomentosa	Native Peach
Tristaniopsis laurina	Water Gum

Shrubs

Species	Common Name
Actephila lindleyi	Actephila
Capparis arborea	Brush Caper Berry
Citriobatus pauciflorus	Orange Thorn
Cordyline rubra	Red-fruited Palm Lilly
Eupomatia laurina	Bolwarra
Randia benthamiana	Native Gardenia
Wilkiea autroqueenslandica	Smooth Wilkiea
Wilkiea heugeliana	Veiny Wilkiea

Herbs and Groundcovers

Species	Common Name
Alocasia brisbanensis	Cunjevoi
Alpinia caerulea	Native Ginger
Dianella caerulea	Flax Lilly
Elatostema reticulatum	Rainforest Spinach
Lomandra hystrix	Creek Mat-rush
Lomandra spicata	Rainforest Mat-rush

APPENDIX 6: Daily Record Sheet

RESTORATION WORK REGENERATION DAILY RECORD DATA SHEET

Remnant / Site / Name:	**Supervisor Name & Contact:**	**Site Owner & Contact:**	**APVMA Permit Number**	**Date**	
			PER9907	**Code**	

Team Members & Hours Worked: *e.g. J Bloggs - 7.36*	**Herbicide Use Checklist Completed (✓)**	**Total Hours Worked:**	**Total Days:**	**Days Completed:**	**Days Remaining:**

Area / Zone / Description	**LGA**	**Spraying Time Start**	**Spraying Time Finish**	**Dune**	**R / F**	**Riparian**	**Other**	**Primary m^2**	**Follow Up m^2**	**No. Trees Planted**	**Area Planted m^2**	**Length Planted Riparian**

Area / Zone / Description	**Target**	**Chemical Used**	**Herbicide Brand**	**Rate Used**	**Volume Used (ml)**	**Additives**	**Total Volume Used**	**Equipment Used**	**Wind Speed**	**Wind Direction**	**Other Weather Details**
		Glyphosate *Metsulfuron Methyl* **Other:**	Roundup bioactive® Weedmaster duo® Brushkiller 600® Associate®	1:100 1:50 1:1.5 1:50+1.5g/ 10L Neat 1.5g/10L		Li700 Protec plus® Pulse Tru Blue Vege dye		Backpack Stem injector Poison pot Power spray	*5 km/h*	*N*	*Cloudy*
		Glyphosate *Metsulfuron Methyl* **Other:**	Roundup bioactive® Weedmaster duo® Brushkiller 600® Associate®	1:100 1:50 1:1.5 1:50+1.5g/ 10L Neat 1.5g/10L		Li700 Protec plus® Pulse Tru Blue Vege dye		Backpack Stem injector Poison pot Power spray			

Comments: *Site / work details, manual weeding notes, growing conditions, vegetation type, priorities, significant flora / fauna, weather condition changes etc.*
Insert map of site: