



**Bush Regeneration Action Plan
March 2007
McLeod's Shoot, Coorabell**



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Acknowledgements

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1 Introduction

1.1 Summary

This plan sets goals and describes actions to achieve the rehabilitation and restoration of native vegetation and the enhancement of existing plantings at a Big Scrub remnant on the southern side of Coolamon Scenic Drive. The remnant occurs on the Coolamon Scenic Drive road reserve 290 metres NW of the intersection with the Pacific Highway.

The plan records photos of the site and summarizes its physical, ecological, and social parameters. It then presents a series of maps that show existing vegetation communities, priority environmental and noxious weeds, and the stratification of the site into work zones. Information about threatened species and habitat considerations and monitoring records are presented. A series of proposed on ground works over 3 years are then summarized in an Action Schedule. Long term management of this site incorporates regular weed control in a manner that will assist natural regeneration that will be monitored to measure effectiveness. The plan also contains weed control specifications.

This plan forms a key component of a Biodiversity Management Plan (as outlined in the Byron Biodiversity Conservation Strategy 2004) for the site, and will aid the development of a Roadside Management Plan for Byron Shire.

1.2 Aims and Objectives

Overall aim: To protect, restore and maintain the rainforest vegetation and plantings and enhance habitat values at McLeod's Shoot remnant.

Table 1. Objectives and outcomes

<i>Objective</i>	<i>Measurable outcome</i>
Reduce threats to existing vegetation	Reduction in weed density,
Enhance ecological function and natural regeneration potential	Increase in density and diversity of native seedlings germinating
Protect threatened species and their habitat.	No net loss of threatened species or threatened species habitat.
Monitor and evaluate the progress of works	Comprehensive records of changes to site in response to treatment

2 Site Assessment

2.1 Locality Details

Table 2. Physical, social, and ecological context of McLeod's Shoot Remnant

Details	McLeod's Shoot Remnant
Owner/s	Byron Shire Council
Address	Coolamon Scenic Drive
Location	McLeod's Shoot
Shire	Byron
Lot/DP or parcel number	N/A (Road Reserve)
AMG/MGA co-ordinates	552300 X 6830500
Map Reference	Byron Bay 9640-4S 1:25 000
Property area	1.4ha
Zoning (Byron LEP 1988)	N/A
Current land use	Vegetated road reserve
Restoration Area	1.4ha
Neighbouring properties	Messrs J P & N R & Gary C Singh Lot 1 /DP 1003768, P O Box 72 Bangalow NSW 2479 Contact Geoff Singh 04199847109 Mrs G & Mr AS Wilton Lot12/DP 786983 28 Coolamon Scenic Drive Coorabell NSW 2479
Geology and Landform	Narrow to moderately broad ridge with moderately deep to deep well-drained Krasnozems and brownish red Krasnozems (Morand 1994:82).
Soil Depth	Moderately deep 100-200cm (Morand 1994)
Topography	160m elevation, crest
Aspect	NE and SW
Existing Vegetation Cover	Subtropical rainforest on exposed ridge with <10% Camphor Laurel present (Byron Flora and Fauna Study). Some plantings (c. 1998) on western edge of remnant
Conservation Status	Very High Ecological Value Vegetation; identified as subregional wildlife corridor for fragmented key habitats from coastal plain to hinterland.
Priority environmental weeds	Madeira Vine, Winter Senna, Lantana. (See table 7 for complete list)

2.2 Vegetation Description

Most of the site is covered in remnant subtropical rainforest with a strip of plantings along the western edge. It occurs on the north-eastern edge of the former Big Scrub and the rainforest vegetation is consistent with the White Booyong (*Argyrodendron trifoliatum*) Alliance/White Booyong (*Argyrodendron trifoliatum*) suballiance described by Floyd (1990). The planting was carried out in the mid to late 1990s using species that for the most part are considered to have naturally occurred on the site. Some of the planted species, however, such as Pink Euodia, Tallow Wood, Swamp Mahogany, Deep Yellow-wood, Magenta Lilly Pilly, and Kauri Pine, are either

not local or would not have naturally occurred here. A comprehensive list of flora species is provided in Section 7, Table 6.

The Byron Flora and Fauna study defined this vegetation as being of Very High Conservation Value. It provides habitat for four threatened flora species, including White Laceflower (*Archidendron hendersonii*), Arrowhead Vine (*Tinospora tinosporoides*), Small-leaved Tamarind (*Diploglottis campbellii*), and Magenta Lilly Pilly (*Syzygium paniculatum*). The latter two species were most likely planted. Magenta Lilly Pilly is not native to the north coast.

The eastern edge of the remnant has a large number of saplings growing, which are being hampered by weed infestation. The saplings will provide a thick edge for the site when they have grown. The main weeds on this edge are Madeira Vine and Lantana, with some Senna. The Madeira infestation extends into the remnant, and some large vines are draped from canopy trees. There are also two large patches of Senna on the western edge amongst the plantings.

There is a high diversity of ferns and native grasses in the understorey of this site.

The southern corner has been planted with mainly exotic species including a Rubber Tree, Slash Pine, and Hibiscus. Winter Senna is also thick in the understorey. The neighbours across the road, the Wiltons, have planted a row of Hoop Pines. They value the vegetation here as a windbreak that protects their property across the road. They would prefer that this vegetation be preserved.

As seen in **Map 1, Vegetation**, the site is surrounded by large tracts of cleared land and is an isolated clump on the crest of a hill. The entire site falls under a regional wildlife corridor and is therefore of High Conservation Value. A larger patch of regrowth on private land is across the highway at Brown's Crescent, and there is more regrowth of varying quality to the NW and SW of the site. The slopes and valley to the East of the site is primarily pasture grass. This map also shows the locality of Threatened species of flora, some of which are planted on this site.

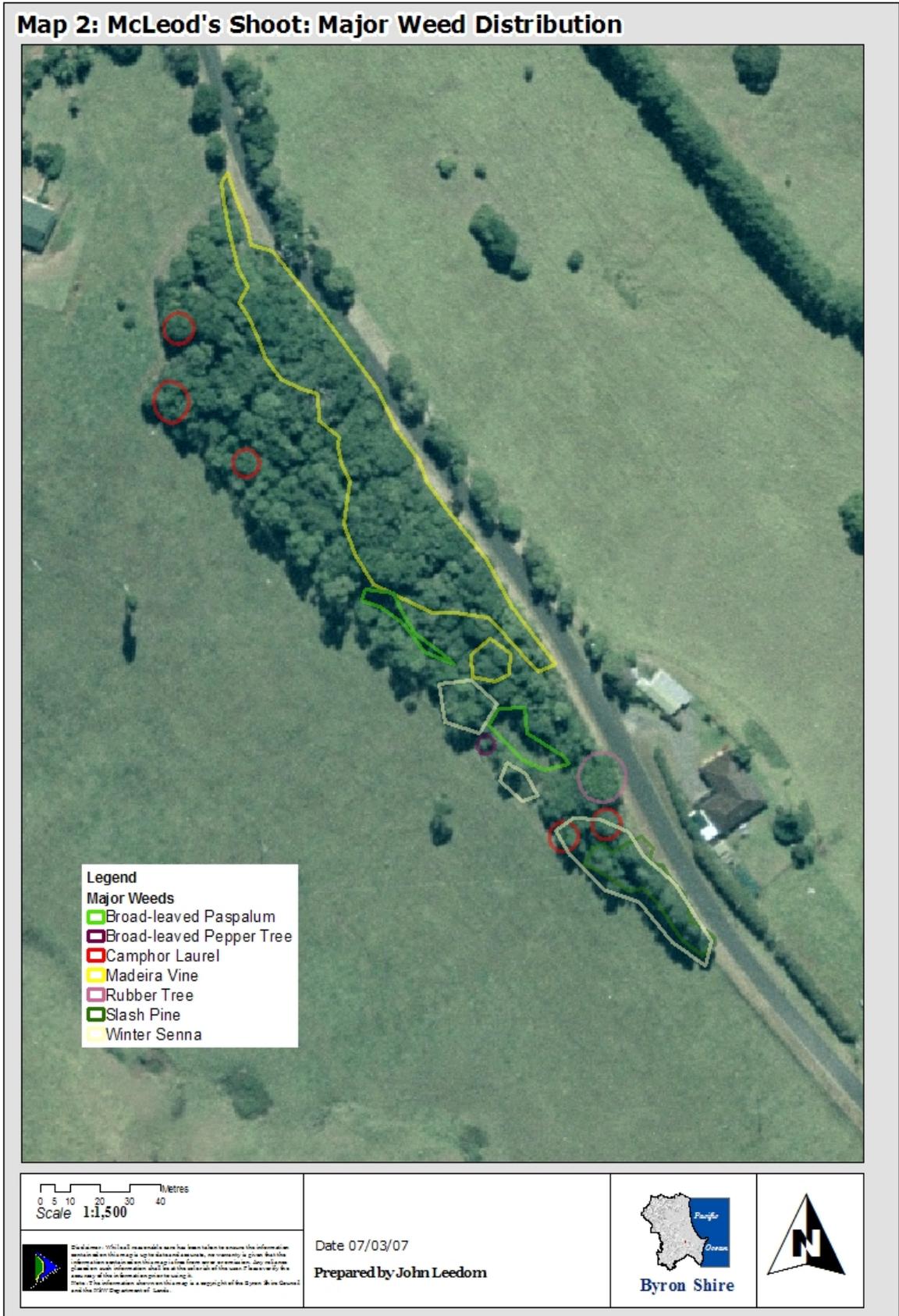
Map 2 shows the location of the infestations of the major environmental weeds on site. A complete list of the forty species of weed present is provided in Section 8, Table 7.

See **Section 6 Monitoring Data** for field observations in 2006 of each stratum of vegetation and **Section 8** for a complete species list.

2.3 Vegetation Map



2.4 Weed Map



3 Action Schedule

3.1 Restoration rationale

The main restoration actions required for this site fall under the headings:

- Identify and protect threatened species and their habitat
- Control all serious weeds
- Undertake long term weed management and maintenance
- Increase natural regeneration potential
- Monitor the effectiveness of restoration works.

The table in **Section 3.4** provides the details of restoration activities required to achieve these goals. The actions are provided in chronological order that reflects their priority.

3.2 Stratification of Site and Treatment

The site has been stratified into 3 working zones that are shown on **Map 3**. These are:

Work Zone 1: Dense rainforest canopy with a high level of Madeira infestation. This Zone extends from the Northern boundary southwards to where the remnant starts to narrow. It requires intensive control of large vines and Lantana with repeated follow up of tuberlings. Some weed control works just over the northern boundary would also benefit the remnant.

Work Zone 2: Dense rainforest canopy tapering off to a single row of trees. This zone extends from the Southern edge of Zone 1, down to the tip of the row of pine and hibiscus trees. This Zone requires repeated control of Madeira tuberlings and staged removal of woody weeds that gain in density as the remnant narrows. Control of Broad-leaved Paspalum would be required to enhance further regeneration potential.

Work Zone 3: Previous Rainforest planting that is well established. This Zone extends along the South Western edge of the remnant. It requires monitoring for encroachment by Madeira Vine and extensive woody weed control, mainly Smooth Senna. A large patch of grass at the southern end could be sprayed out and monitored for regenerating seedlings.

3.3 Zones and monitoring Map



3.4 Action Plan

Table 3. Action Plan for McLeods Shoot

Timing	Actions	Zones	Est person days	Completed
Dec 06 -Jan 07	Spot spray tuberlings	1	2	Dec 07
	Hand-weed tuberlings within patches of native fern	2		
Jan-Apr 07	Hand treat vines and woody weeds	1	9	May 07
Apr 07	Re-spray tuberling regrowth	1	2	Apr 07
Dec 06	Spot spray tuberlings	2	2	Dec 06
	Hand-weed tuberlings within patches of native fern	2		
May 07	Hand treat vines and woody weeds	2	7.5	May 07
Oct 07	Re-spray tuberling regrowth	2	4	
May 07	Hand treat woody weeds	3	6	
	Stem inject camphor laurels and other woody weeds	3	1	
Oct 07	Spot spray Broad-leaved Paspalum, Mistweed, and Senna seedlings	3	1	
Jan 08	Collect monitoring data	1,2,3	3	
Feb 08	Follow-up spray of tuberlings	1	3	
Feb 08	Follow-up spray of tuberlings	2	3	
Oct 08	Follow-up spray of tuberlings	1	3	
Oct 08	Follow-up spray of tuberlings	2	3	
Feb 08	Follow-up hand-weeding of tuberlings within patches of native fern	1, 2	3	
Jan 09	Collect monitoring data	1,2,3	3	
Feb 09	Follow-up spray of tuberlings	1	3	
Feb 09	Follow-up spray of tuberlings	2	3	
Oct 09	Follow-up spray of tuberlings	1	3	
Oct 09	Follow-up spray of tuberlings	2	3	
Oct 09	Spot spray in planting	3	1	
Oct 09	Collect monitoring data		3	
Oct 09	Follow-up hand-weeding of tuberlings within patches of native fern	1, 2	3	

4 Threatened Species

4.1 Flora

Two threatened species were recorded during the field survey. The first, White Laceflower (*Archidendron hendersonii*) is located toward the north-eastern corner of the remnant and is surrounded by Lantana and Madeira Vine. It is classified as Vulnerable under the Threatened Species Conservation Act 1995. The second is Small-leaved Tamarind (*Diploglottis campbellii*). It is classified as Endangered under the Threatened Species Conservation Act 1995. This species may have been planted in the restoration planting on the western edge of site but a number of seedlings were recorded amongst regrowth near the road as well.

A third species, Arrowhead Vine (*Tinospora tinosporoides*) was found in regrowth along the south-eastern edge of the site during initial bush regeneration works. It is classified as Vulnerable under the Threatened Species Conservation Act 1995.

A fourth species, Magenta Cherry (*Syzygium paniculatum*) classified as Vulnerable, was included in the restoration plantings to the west of the site. This species, however, did not naturally occur in the Big Scrub bio-region.

Table 4. Flora of conservation significance recorded on or adjacent to restoration site

Life Form	Family	Species	Common Name	Conservation Significance
Tree	Mimosaceae	<i>Archidendron hendersonii</i>	White Lace Flower	V, 8S Wardell
Tree	Mimosaceae	<i>Archidendron muellerianum</i>	Veiny Lace Flower	3RCa, 8S Alstonville
Shrub-small tree	Rutaceae	<i>Citrus australasica</i>	Finger Lime	8S Victoria Park
Shrub-small tree	Agavaceae	<i>Cordyline rubra</i>	Palm Lily	8S Lismore
Tree	Sapindaceae	<i>Cupaniopsis newmannii</i>	Long-leaved Tuckeroo	2RC-, 8S Tyagarah sth
Tree	Sapindaceae	<i>Diploglottis campbellii</i>	Small-leaved Tamarind	E, 2E
Tree	Rutaceae	<i>Pentaceras australe</i>	Bastard Crow's Ash	8S Richmond River
Tree	Sterculiaceae	<i>Sterculia quadrifida</i>	Peanut Tree	8S Wardell
Small tree	Myrtaceae	<i>Syzygium paniculatum</i>	Magenta Cherry	3VCi
Vine	Cucurbitaceae	<i>Trichosanthes subvelutina</i>	Silky Cucumber	3RC-
Vine	Menispermaceae	<i>Tinospora tinosporoides</i>	Arrow-head Vine	V, 3RC-
Shrub-small tree	Monimiaceae	<i>Wilkiea austroqueenslandica</i>	Smooth Wilkiea	8S Buckombil

Table 5. ROTAP Coding System

Category	Coding	Definition
Plant Distribution	1	Known only from the type* collection
	2	Restricted distribution - range extending over less than 100km
	3	Range more than 100km but in small populations
Conservation Status	X	Presumed extinct - not collected for 50 years or the only known populations destroyed
	E**	Endangered - at serious risk in the short term (one or two decades)
	V**	Vulnerable - at risk over a longer period (20-50 years)
	R	Rare but with no current identifiable threat
	K	Poorly known species suspected of being at risk
Reservation Status	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
	i	Species is considered to be inadequately reserved. Less than 1000 plants occur within a proclaimed reserve
	-	Species is recorded from a reserve but the population size is unknown
	t	Total known species population is within a reserve
	Px	Western Australian Department of Conservation and Land Management (CALM) Priority Flora Code. Range from P1 (highest priority) to P4 (lowest priority).
	+	Species also occurs outside of Australia
<p>* The "type" is the plant specimen used to originally describe a species. ** Species considered to be either Endangered or Vulnerable are classified as "Threatened".</p>		

Detailed descriptions and pictures of these plants are available at the following website:

<http://www.threatenedspecies.environment.nsw.gov.au>

4.2 Fauna

There is one threatened species recorded as occurring on the site, the Rose-Crowned Fruit Dove (*Ptilinopus regina*). A further fourteen species are regarded as potentially occurring on the site whether as residents or nomads. (See Table 4.)

Table 6: Known and potential threatened fauna species - conservation dependant & threatened species

Common Name	Scientific Name	Status	Known/Potential	Sedentary nomadic	Important habitat features
Wompoo Fruit-dove	<i>Ptilinopus magnificus</i>	V	P	N	Regular supply of nutritious fleshy fruits, dense well structured vegetation, nest often

					overhangs ck, minimum habitat area for sedentary pair approx 20ha.
Superb Fruit-dove	<i>Ptilinopus superba</i>	V	P	N	Regular supply of nutritious fleshy fruits, dense well structured vegetation. Mainly from large tracts.
Rose-crowned Fruit-dove	<i>Ptilinopus regina</i>	V	K	N	Regular supply of nutritious fleshy fruits (including Camphor Laurel), dense well structured vegetation. Highly nomadic where utilises small fragments. Breeds Nov – July.
Square-tailed Kite	<i>Lophoictinia isura</i>	V	P	N	Specialist hunter of passerines, especially honeyeaters and mostly nestlings, and insects. Minimum home range of 100 km ² .
White eared Monarch	<i>Monarha leucotis</i>	V	P	N	Insectivore. Dense canopied forest with gaps/edges. Minimum habitat area presumed to be approx 20 ha.
Double-eyed Fig Parrot	<i>Cyclopsitta diophthalma coxeni</i>	E1	P	N	Frugivore especially fig fruits.
Common Planigale	<i>Planigale maculate</i>	V	P	S	Fierce, carnivorous nocturnal hunters, prey on insects and small vertebrates/ Require crevices, hollow logs, bark for daytime shelter
Long-nosed Potoroo	<i>Potorous tridactylus</i>	V	P	S	Dense layer of grasses, ferns, vines or shrubs. Prefer sandy loam soil. Home range 2-5 ha.
Common Blossom Bat	<i>Syconycteris australis</i>	V	P	N	Regular supply of nectar producing blossoms. Dense vegetation for roosting.
Black Flying-fox	<i>Pteropus alecto</i>	V	P	N	Regular supply of nectar producing blossoms and fleshy fruits. Dense vegetation for roosting.
Grey Headed Flying-fox	<i>Pteropus poliocephalus</i>	V	P	N	Regular supply of nectar producing blossoms and fleshy fruits. Dense vegetation for roosting.
Little Bentwing Bat	<i>Miniopterus australis</i>	V	P	N	Caves, tunnels, hollow bearing trees.
Common Bentwing Bat	<i>Miniopterus schreibersii</i>	V	P	N	Caves, tunnels, hollow bearing trees.
Large-footed Myotis	<i>Myotis adversus</i>	V	P	N	Riparian specialist that hunts fish & invertebrates from open water bodies. Roosts in dense foliage, under exfoliating bark, tree

					hollows, bridge cavities, caves & tunnels.
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5 Habitat Features to be Maintained/ Enhanced

Table 7 shows habitat resource and target species.

Habitat feature	Characteristic species	Condition/extent/threats	Action/comments
Epiphytes & lichens	Paradise Riflebird <i>Ptiloris paradiseus</i> , Brown Gerygone <i>Geryone mouki</i> , Yellow throated Scrubwren <i>Sericornis citreogularis</i>	Some epiphytes (notably Bird's Nest ferns) present. Lichen important for nesting material for Scrubwrens, whose nests can be used by Golden-tipped Bat <i>Kerivoula papuensis</i> .	Promote moist micro-climate and structural complexity.
Tree hollows and stags.	Sugar Glider <i>Petaurus breviceps</i> , various micro-chiropteran bats, King Parrot <i>Alisterus scapularis</i> , Boobook Owl <i>Ninox connivens</i> , White-throated Treecreeper <i>Cormobates leucophaeus</i> , Brown Tree-snake <i>Boiga irregularis</i> , Bleating Tree-frog <i>Litoria dentata</i> , Green Tree-frog <i>Litoria caerulea</i> .	Some on site, present in large mature Black Beans, Foambarks, and Figs.	
Mistletoe	Mistletoe Bird <i>Dicaeum hirundinaceum</i> , various nectivores that feed on mistletoe nectar.	None recorded.	Placement of coarse ground debris such as logs worth consideration.
Rocky outcrop	Basking habitat for various reptiles when located in sunny position e.g. Eastern Water Skink <i>Eulamprus quoyii</i> , Eastern Water Dragon <i>Physignanthus lesuerii</i> , Carpet Snake <i>Morelia spilota</i> . Sheltering habitat for range of species where cracks occur.	Very limited on site, mainly as individual rocks and small stones.	Maintain sun exposure to any rocky outcrops.
Vine thicket	Nesting or sheltering habitat for Pale Yellow Robin <i>Tregellasia capito</i> , Carpet Snake, Northern Brown Bandicoot <i>Isodon macrourus</i> , Southern Forest Dragon <i>Hypsilurus spinipes</i>	Vine thickets consisting of Whip Vine, Lawyer Vine, Native Derris, and other species occur across the site, particularly on edges.	Maintain vine thickets wherever possible, especially on edges to maintain microclimate. However, some cutting back of vines will be necessary to manage extensive Madeira Vine infestation.
Fleshy Fruits	Various frugivores – e.g. Rose-crowned Fruit-dove <i>Ptilinopus regina</i> , Topknot Pigeon <i>Lopholaimus antarcticus</i> , Brown	Some mature high quality fleshy fruited trees on site, especially Figs.	Control threats to existing fleshy fruited species.

	Cuckoo-dove <i>Macropygia amboinensis</i> , Figbird <i>Sphecotheres viridis</i> , Satin Bowerbird <i>Ptilonorynchus violaceus</i> , Silveryeye <i>Zosterops lateralis</i> , Lewins Honeyeater and Black Flying-fox <i>Pteropus alecto</i> .		
Nectar	Various nectivores – e.g. Scaly breasted Lorikeet <i>Trichoglossus chlorolepidotus</i> , Noisy Friarbird <i>Philemon corniculatus</i> , Brown Honeyeater <i>Lichmera indistincta</i> , Scarlet Honeyeater <i>Myzomela sanguinolenta</i> , Sugar Glider and Grey- headed Flying-fox <i>Pteropus poliocephalus</i> .	Very few mature high quality nectar producing trees on site. However, planting contains fair number of nectar producing species, which on maturing will improve availability of seasonal food resources.	Control threats to existing nectar producing species.
Invertebrates	Grey Fantail <i>Rhipidura fuliginosa</i> , Brown Thornbill <i>Acanthiza pusilla</i> , White-browed Scrubwren <i>Sericornis frontalis</i> , Variegated Fairy-wren <i>Malurus lambertii</i> , Rose Robin <i>Petroica rosea</i> (winter migrant), various species of micro-chiropteran bats and omnivores such as Lewins Honeyeater <i>Megaphaga lewinii</i>	Invertebrate production likely to be high due to various leaf types, fast growth of young planted trees and large number of pioneer species. Ground invertebrates may be impacted following herbicide application; however proximity to non sprayed areas will ensure rapid recruitment of ground invertebrates.	Promote structural complexity.
Foliage	Greater Glider <i>Petauroides volans</i> .		
Leaf litter	Eastern Whipbird <i>Psophodes olivaceus</i> , Logrunner <i>Orthonyx temminckii</i> , Brush Turkey <i>Alectura lathami</i> , Challengers Skink <i>Saproscincus challengeri</i> , Dwarf Crowned Snake <i>Cacophis krefftii</i> , Blackish Blind Snakes <i>Ramphotyphlops nigrescens</i> .		Promote structural complexity.
Fallen logs.	Basking habitat for various reptiles when located in sunny position. Important	Limited habitat resource on site due to small size of remnant.	Promote structural complexity.

	sheltering habitat for terrestrial mammals and reptiles e.g. Northern Brown Bandicoot, Land Mullet <i>Egernia major</i> , Major Skink <i>Egernia frerei</i> , Eastern Small-eyed Snake <i>Rhinoplocephalus nigrescens</i> .		
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6 Monitoring Data

The action schedule allows for monitoring data to be collected on an annual basis and a report summarising the findings to be produced. The locality of the monitoring plots is marked on **Map 3**.

Table 8. Monitoring Data for Plot 1.

Site: McLeods Shoot		Date: 07.02.06		Recorders: Wendy Neilan, Hank Bower		
Plot: 1	Area sampled : 25 m ²	Dimens ions: 5 m x 5 m	Weath er: southerly wind , showers			
Sites Conditions						
Disturbance type & level		Soil	Light access	Aspe ct	Slope	Other observations
cleared and grazed, high		deep kras-nozem	high	NW	15%	Moderate, regrowth, planting Sthn edge
Estimated Cover Abundance %						
	All Strata	Emerg ents	Canopy	MidSt ore	Unders torey	Ground Cover
Ht range (m)	0-8	-	>6-8	>2-6	0.5-2	<0.5
Total FPC	98%	-	60%	5%	1%	85%
Total Native FPC	-	-	15%	5%	0.33%	1%
Total Exotic FPC	-	-	45%	0%	0.66%	84%

3 Largest trees						
	Species	Common Name		Circumference (cm)		
1	?	?		43.5		
2	?	?		64		
3	?	?		51		
Number of Individual stems						
< 50 cm	50cm - 2m	2m - 5m	> 5m	Comments		
				stems in plot		
0	8	6	10			
Stratum / Scientific Name		Common Name		Abund ance rating		
Emerg-ents						
Canopy						
<i>Commersonia bartramia</i>		Brown Kurrajong		2	number of individuals	
<i>Melicope elleryana</i>		Pink Euodia		1	"	
<i>Polyscias elegans</i>		Celerywood		2	"	
<i>Syzygium paniculatum</i>		Magenta Lily Pilly		4		
<i>Toona ciliata</i>		Red Cedar		1		

Mid-Storey			
<i>Commersonia bartramia</i>	Brown Kurrajong	1	number of individuals
<i>Polyscias elegans</i>	Celerywood	5	"
Understorey			
<i>Glochidion ferdinandi</i>	Cheese Tree	1	number of individuals
<i>Guioa semiglauca</i>	Guioa	1	"
<i>Ligustrum lucidum</i>	Large-leaved Privet	1	"
<i>Mallotus philippensis</i>	Red Kamala	1	"
<i>Polyscias elegans</i>	Celerywood	2	"
<i>Senna pendula var. glabrata</i>	Winter Senna	1	"
<i>Solanum mauritianum</i>	Wild Tobacco	1	"
Ground Cover			0=absent, 1=rare, 2=uncommon, 3=common, 4=abundant
<i>Ageratina riparia</i>	Mistweed	4	
<i>Anredera cordifolia</i>	Madeira Vine		
<i>Aphananthe philippinensis</i>	Rough-leaved Elm		
<i>Argyrodendron trifoliolatum</i>	White Booyong		
<i>Geitonoplesium cymosum</i>	Scrambling Lily		
<i>Guioa semiglauca</i>	Guioa		
<i>Paspalum wettsteinii</i>	Broad-leaved Paspalum	4	
<i>Pseuderanthemum variabile</i>	Pastel Flower		
<i>Wilkiea austroqueenslandica</i>	Smooth Wilkiea		
<i>Wilkiea huegeliana</i>	Veiny Wilkiea		

Table 9. Monitoring Data for Plot 2.

Site: McLeods Shoot		Date: 08.02.06		Recorders: Wendy Neilan, Hank Bower		
Plot: 2	Area sampled: 25 m ²	Dimensions: 5 m x 5 m	Weather: mild, cloudy			
Site Conditions						
Disturbance type & level	Soil	Light access	Aspect	Slope	Other observations	
moderate, regrowth	deep krasnozem	mod-high	N	slight		
Estimated Cover Abundance %						
	All Strata	Emergents	Canopy	Mid-Storey	Under-storey	Ground Cover
Ht range (m)	0-20	20	10-16	2-10	0.5-2	<0.5
Total FPC **	70%	5%	55%	30%	<5%	10%
Total Native FPC	70%	5%	55%	30%	<5%	>9%
Total Exotic FPC	0%	0%	0%	0%	0%	<1%
3 Largest trees						
	Species	Common Name		Circumference (cm)		
1	?	?		70.5		
2	?	?		70		
3	?	?		75		
Number of Individual stems						
< 50 cm	50cm - 2m	2m - 5m	> 5m	Comments		
				stems rooted in plot		
187	18	15	4			
Stratum / Scientific Name				Common Name	Abundance rating	
Emergents						
<i>Ficus watkinsiana</i>				Strangling Fig	1	number of individuals
Canopy						
<i>Argyrodendron trifoliolatum</i>				White Booyong	1	number of individuals
<i>Diploglottis australis</i>				Native Tamarind	1	"
MidStorey						
<i>Aphananthe philippinensis</i>				Rough-leaved Elm	4	number of individuals
<i>Bridelia exaltata</i>				Brush Ironbark	1	"
<i>Dysoxylum mollissimum</i>				Red Bean	1	
<i>Ficus fraseri</i>				Sandpaper Fig	1	
<i>Guioa semiglauca</i>				Guioa	5	
<i>Mallotus philippensis</i>				Red Kamala	1	
<i>Neolitsea australiensis</i>				Green Bolly Gum	2	

Understorey			number of individuals
<i>Alpinia caerulea</i>	Native Ginger	2	"
<i>Ancana stenopetala</i>	Ancana	1	"
<i>Aphananthe philippinensis</i>	Rough-leaved Elm	1	"
<i>Bridelia exaltata</i>	Brush Ironbark	2	"
<i>Calamus muelleri</i>	Wait-a-While	1	"
<i>Citriobatus pauciflorus</i>	Orange Thorn Smooth	10 to 20	"
<i>Clerodendrum floribundum</i>	Clerodendrum	5	"
<i>Mallotus philippensis</i>	Red Kamala	1	"
<i>Wilkiea huegeliana</i>	Veiny Wilkiea	2	"
Ground Cover		number of individuals	
<i>Oplismenus aemulus</i>	basket grass	4	"
<i>Argyrodendron trifoliolatum</i>	White Booyong	4	"
<i>Syagrus romanzoffiana</i>	Cocos Palm	1	"
<i>Senna pendula var. glabrata</i>	Winter Senna	1	"
Vines & Scramblers			
	< 50 cm ht	11	number of stems
	> 50 cm ht	9	"

Table 10. Monitoring Data for Plot 3.

Site: McLeods Shoot		Date: 08.02.06		Recorders: Wendy Neilan, Hank Bower		
Plot: 3	Area sampled: 25 m ²	Dimension s: 5 m x 5 m	Weather: overcast, bright			
Site Conditions						
Disturbance type & level	Soil	Light access	Aspect	Slope	Other observations	
moderate, regrowth	Deep Krasnoze m	mod-high	N	slight	Canopy gap Heavily infested with Madeira, under semi-deciduous trees	
Estimated Cover Abundance %						
	All Strata	Emerg-ents	Canopy	Mid-Storey	Under-storey	Ground Cover
Ht range (m)	0-20		10-20	2-10	0.5-2	<0.5
Total FPC **	70%	-	40%	15%	40%	45%
Total Native FPC	50%	-	35%	3%	35%	22%
Total Exotic FPC	20%	-	5%	12%	5%	23%

3 Largest trees	Species	Common Name	Circumference (cm)
1	?		59
2	?		93.5
3	?		58

Number of Individual stems				
< 50 cm	50cm - 2m	2m - 5m	> 5m	Comments stems in plot
5	10	5	3	

Stratum / Scientific Name	Common Name	Abundance rating	
Emergents			
Canopy			number of individuals
<i>Ficus fraseri</i>	Sandpaper Fig	2	"
<i>Mallotus philippensis</i>	Red Kamala	1	"
MidStorey			number of individuals
<i>Ancana stenopetala</i>	Ancana	2	"
<i>Senna pendula var. glabrata</i>	Winter Senna	1	"
<i>Wilkiea huegeliana</i>	Veiny Wilkiea	1	"
Understorey			number of individuals
<i>Guioa semiglauca</i>	Guioa	1	"
<i>Hymenosporum flavum</i>	Native Frangipani	1	"

<i>Jagera pseudorhus</i>	Foambark	2	"
<i>Mallotus philippensis</i>	Red Kamala	2	"
<i>Wilkiea huegeliana</i>	Veiny Wilkiea	4	"
Ground Cover			
<i>Aphananthe philippinensis</i>	Rough-leaved Elm	1	number of individuals
<i>Cryptocarya obovata</i>	Pepperberry	1	"
<i>Guioa semiglauc</i>	Guioa	1	"
<i>Wilkiea huegeliana</i>	Veiny Wilkiea	1	"
ginger present as 3 clumps not in stem count + 1 small individual			
Madeira vine 2000+ individuals			
Vines & Scramblers			
			0=absent, 1=rare, 2=uncommon, 3=common, 4=abundant
<i>Calamus muelleri</i>	Wait-a-While	3	
<i>Maclura cochinchinensis</i>	Cockspur Thorn	1	"
<i>Trichosanthes subvelutina</i>	Silky Cucumber	1	"
<i>Malaisia scandens</i>	Burny Vine	3	"
<i>Jasminum dallachi</i>	Soft Jasmine	4	"
<i>Lantana camara</i>	Lantana	2	"
<i>Anredera cordifolia</i>	Madeira Vine	4	"
	< 50 cm	0	low
	> 50 cm	60+	high

Table 11. Habitat Assessment

		Site McLeods Shoot	Plot area	Plot dimensions	
		Plot Observers H B & WN			
Habitat Indicator		Measure	Data	Notes	Merv Suggested Measure
Hollows	Trunk Hollows (> 300mm)	% of trees present bearing hollows	low		Number per plot
	Moderate branch hollows (100-300 mm)	% of trees present bearing hollows			Number per plot
	Small branch hollows (< 100 mm)	% of trees present bearing hollows	low-mod		Number per plot
Woody debris	Large Logs (> 600 mm diam)	% Cover of site	0		% Cover / Number
	Small - Moderate woody debris (0 - 600 mm diam)	% Cover of site	low		% Cover / Number
Stags	Large Stags (>1000 mm diam)	% Cover of site			Number per plot
	Small stags (<= 1000 mm diam)	% Cover of site			number per plot
Rocky Outcrops, cliff lines / overhangs, Large		% Cover of site	0		% Cover

rocks.						
Fleshy Fruited plants	camphor	Density Index of Camphor laurel			Number (or Index of Density) of FF species	
	other (ex camphor)	Density Index of other Fleshy Fruited species	medium	as a fauna resource,		
Nectar producing plants	height cover		low		Number or (Index of Density) of Nect. species	
Palms					Number or (Index of density) of palms	
Mistletoe		?	0		Number per plot	
Large-leaved Epiphytes			0		Number or (Index of density) of Epiphytes	
Decorticating bark			1 = No decorticating bark 2 = Low, 3= Medium 4 = High	low		rate: 1-4
Leaf Litter			1 = No leaf litter 2 = Low, 3= Medium 4 = High	5 cm		Average Depth (mm)
				85%		% Cover
Ground Cover vegetation			average height (m)			height %, cover/density
			% cover			
Soil fertility			3-high 2-medium 1-low	High		1-high 2-medium 3-low
Riparian influence						
Soaks			Presence -1 absence - 0	0		
Evidence of flooding			Yes/ No	No		Yes, No

Fire

Evidence of fire
Intensity of fire

None visible		High, medium, low, None Visible
N/A		Hot, medium, cold.

other site observations

figs, firewheel, booyong, microclimate poor as all site is edge affected

7 Monitoring Photographs



1. Monitoring Plot #1



2. Monitoring Plot #1



3. Monitoring Plot # 2



4. Monitoring Plot # 3



5. Monitoring Plot # 3. Note large Madeira Vines with clusters of tubers in mid-storey.



6. Monitoring Plot #3. Madeira Vine draping tree.

8 Species List

Table 6. Flora species occurring at McLeods Shoot

<u>Scientific Name</u>	<u>Common Name</u>	<u>Conservation Significance</u>	<u>Exotic/Planted</u>
<i>Actephila lindleyi</i>	Actephila		
<i>Adiantum atroviride</i>	A Maidenhair fern		
<i>Agathis robusta</i>	Kauri Pine		planted
* <i>Ageratina riparia</i>	Mistweed	#	exotic
<i>Ailanthus triphysa</i>	White Bean		
<i>Alocasia brisbanensis</i>	Cunjevoi		
<i>Alphitonia excelsa</i>	Red Ash		
<i>Alpinia arundelliana</i>	A native ginger		
<i>Alpinia caerulea</i>	Native Ginger		
<i>Ambrosia artemisiifolia</i>	ragweed		exotic
<i>Ancana stenopetala</i>	Ancana		
* <i>Anredera cordifolia</i>	Madeira Vine, Potato Vine	#	exotic
<i>Aphananthe philippinensis</i>	Rough-leaved Elm		
<i>Araucaria cunninghamii</i>	Hoop Pine		planted
<i>Archidendron hendersonii</i>	White Lace Flower	8S Wardell 3RCa, 8S Alstonville	
<i>Archidendron muellerianum</i>	Veiny Lace Flower		
<i>Archontophoenix cunninghamiana</i>	Bangalow Palm		
<i>Argyrodendron trifoliolatum</i>	White Booyong		
<i>Arytera distylis</i>	Twin-leaved Coogera		
<i>Asplenium australasicum</i>	Bird's Nest Fern		
<i>Austromyrtus bidwillii</i>	Python Tree		
<i>Austrosteenisia glabristyla</i>	Giant Blood Vine		
	Broad-leaved Carpet		
* <i>Axonopus compressus</i>	Grass	#	exotic
<i>Baloghia inophylla</i>	Brush Bloodwood		
* <i>Bidens pilosa</i>	Farmer's Friend		exotic
<i>Brachychiton acerifolius</i>	Flame Tree		planted
<i>Breynia oblongifolia</i>	Coffee Bush		
<i>Bridelia exaltata</i>	Brush Ironbark		
<i>Calamus muelleri</i>	Wait-a-While		
	Blunt-leaved Native		
<i>Callerya australis</i>	Wisteria		
<i>Callerya megasperma</i>	Native Wisteria		
<i>Capparis arborea</i>	Brush Caper Berry		
<i>Carronia multisejala</i>	Carronia		
<i>Castanospermum australe</i>	Black Bean		
<i>Celastrus subspicata</i>	Large-leaf Staff Vine		
<i>Cheirostylis ovata</i>	A terrestrial orchid		
* <i>Chloris gayana</i>	Rhodes grass	#	exotic
* <i>Cinnamomum camphora</i>	Camphor Laurel	#	exotic
<i>Cinnamomum virens</i>	Red-barked Sassafras		
<i>Cissus antarctica</i>	Water Vine		
<i>Citriobatus pauciflorus</i>	Orange Thorn		
<i>Citrus australasica</i>	Finger Lime	8S Victoria Park	
<i>Clerodendrum floribundum</i>	Smooth Clerodendrum		
<i>Commelina cyanea</i>	Blue Wandering Dew		
<i>Commersonia bartramia</i>	Brown Kurrajong		

<i>*Conyza bonariensis</i>	Fleabane	#	exotic
<i>Cordyline petiolaris</i>	Broad-leaved Palm Lily		planted
<i>Cordyline rubra</i>	Palm Lily	8S Lismore	
<i>Cryptocarya glaucescens</i>	Jackwood		planted
<i>Cryptocarya obovata</i>	Pepperberry		
<i>Cupaniopsis anacardioides</i>	Tuckeroo		
<i>Cupaniopsis newmannii</i>	Long-leaved Tuckeroo	2RC-, 8S Tyagarah sth	
<i>Cyperus sp.</i>	A sedge		
<i>Cyperus tetraphyllus</i>	Four-leaved Flat Sedge		
<i>Dendrocnide photinophylla</i>	Shiny-leaved Stinging Tree		
<i>Derris involuta</i>	Native Derris		
<i>Desmodium unicanatum</i>	Silver-leaved Desmodium		exotic
<i>Dianella caerulea var petasmatodes</i>	Blue Flax Lily		
<i>*Digitaria ciliaris</i>	Summer grass	#	exotic
<i>Dioscorea transversa</i>	Native Yam		
<i>Diospyros pentamera</i>	Myrtle Ebony		
<i>Diploglottis australis</i>	Native Tamarind		
<i>Diploglottis campbellii</i>	Small-leaved Tamarind	E	probably planted
<i>Doodia aspera</i>	Prickly Rasp Fern		
<i>Duboisia myoporoides</i>	Soft Corkwood		
<i>Dysoxylum fraserianum</i>	Rosewood		
<i>Dysoxylum mollissimum</i>	Red Bean		
<i>Dysoxylum rufum</i>	Hairy Rosewood		
<i>Ehretia acuminata</i>	Koda		planted
<i>Elaeocarpus grandis</i>	Blue Fig		
<i>Elaeocarpus kirtonii</i>	Silver Quandong,		planted
<i>Elaeocarpus obovatus</i>	Hard Quandong		
<i>Elattostachys nervosa</i>	Green Tamarind		
<i>Embelia australiana</i>	Embelia		
<i>Endiandra pubens</i>	Hairy Walnut		
<i>Eucalyptus microcorys</i>	Tallowwood		planted
<i>Eucalyptus robusta</i>	Swamp Mahogany		planted
<i>*Ficus elastica</i>	Rubber Tree		exotic
<i>Ficus fraseri</i>	Sandpaper Fig		
<i>Ficus watkinsiana</i>	Strangling Fig		
<i>Flagellaria indica</i>	Whip Vine		
<i>Flindersia australis</i>	Australian Teak		planted
<i>Flindersia schottiana</i>	Cudgerie		
<i>Flindersia xanthoxyla</i>	Yellowwood		planted
<i>Geitonoplesium cymosum</i>	Scrambling Lily		
<i>Glochidion ferdinandi</i>	Cheese Tree		
<i>*Gomphocarpus fruticosus</i>	cotton bush	#	exotic
<i>Glycine clandestina</i>	Twining Glycine		
<i>Gmelina leichhardtii</i>	White Beech		planted
<i>Grevillea robusta</i>	Silky Oak		planted
<i>Guioa semiglauca</i>	Guioa		
<i>Gymnostachys anceps</i>	Settler's Flax		
<i>Harpullia pendula</i>	Tulipwood		planted
<i>Hedraianthera poryphropetala</i>	Hedraianthera		
<i>Helicia glabriflora</i>	Brown Oak		
<i>Hibiscus sp.</i>	Hibiscus sp.	#	exotic
<i>Hymenosporum flavum</i>	Native Frangipani		planted

<i>Jagera pseudorhus</i> var. <i>pseudorhus</i> forma <i>pseudorhus</i>	Foambark		
<i>Jasminum dallachi</i>	Soft Jasmine		
* <i>Lantana camara</i>	Lantana	#	exotic
<i>Lastreopsis marginans</i>	Bordered Shield Fern		
* <i>Ligustrum lucidum</i>	Large-leaved Privet	#	exotic
* <i>Ligustrum sinense</i>	Small-leaved Privet	#	exotic
<i>Linospadix monostachya</i>	Walking Stick Palm		
<i>Litsea australis</i>	Brown Bolly Gum		
<i>Lophostemon confertus</i>	Brush Box		planted
<i>Macaranga tanarius</i>	Macaranga		
<i>Maclura cochinchinensis</i>	Cockspur Thorn		
* <i>Macroptilium atropurpureum</i>	Siratro		exotic
<i>Malaisia scandens</i>	Burny Vine		
<i>Mallotus discolor</i>	White Kamala		
<i>Mallotus philippensis</i>	Red Kamala		
<i>Marsdenia lloydii</i>	Corky Marsdenia		
<i>Melia azedarach</i> var. <i>australasica</i>	White Cedar		planted
<i>Melicope elleryana</i>	Pink Euodia		planted
* <i>Melinis minutiflora</i>	Molasses Grass	#	exotic
* <i>Melinis repens</i>	Red Natal Grass	#	exotic
<i>Melodinus australis</i>	Southern Melodinus		
<i>Mischocarpus pyriformis</i>	Yellow Pear-fruit		
<i>Neolitsea australiensis</i>	Green Bolly Gum		
<i>Neolitsea dealbata</i>	White Bolly Gum		
<i>Oplismenus aemulus</i>	Basket Grass		
<i>Oplismenus imbecillis</i>	Creeping Basket Grass		
<i>Pandorea baileyana</i>	Large-leaved Wonga Vine		
<i>Pandorea jasminoides</i>	Bower Vine		
<i>Pandorea pandorana</i>	Wonga Vine		
<i>Panicum pygmaeum</i>	Pygmy Panic		
<i>Pararchidendron pruinatum</i>	Snow Wood		
* <i>Paspalum urvillei</i>	Giant Paspalum		exotic
* <i>Paspalum wettsteinii</i>	Broad-leaved Paspalum	#	exotic
* <i>Passiflora suberosa</i>	Corky Passionflower	#	exotic
* <i>Passiflora subpeltata</i>	White Passionflower	#	exotic
* <i>Pellaea viridis</i>	a South African fern	#	exotic
<i>Pentaceras australe</i>	Bastard Crow's Ash		
* <i>Phytolacca octandra</i>	Inkweed		
<i>Pittosporum revolutum</i>	Hairy Pittosporum		Planted?
<i>Pittosporum rhombifolium</i>	Hollywood		planted
<i>Pittosporum undulatum</i>	Sweet Pittosporum		
<i>Planchonella australis</i>	Black Apple		
<i>Planchonella myrsinoides</i>	Blunt-leaved Coondoo		
<i>Podocarpus elatus</i>	Plum Pine		
<i>Polyscias elegans</i>	Celerywood		
<i>Pothos longipes</i>	Pothos		
<i>Pseuderanthemum variabile</i>	Pastel Flower		
<i>Rhodamnia rubescens</i>	Scrub Turpentine		planted
<i>Rhodosphaera rhodanthema</i>	Deep Yellowwood		planted
<i>Ripogonum album</i>	White Supplejack		
<i>Ripogonum elseyanum</i>	Hairy Supplejack		

8S Richmond
River

<i>*Sansevieria trifasciata</i>	Mother in law tongue's		exotic
<i>Sarcomelicope simplicifolia</i>	Bauerella		
<i>Sarcopteryx stipata</i>	Steelwood		
<i>*Schefflera actinophylla</i>	Umbrella Tree	#	exotic
<i>*Schinus terebinthifolia</i>	Broad-leaved pepper tree	#	exotic
<i>Scolopia braunii</i>	Flintwood		
<i>*Senna pendula var. glabrata</i>	Winter Senna	#	exotic
<i>*Setaria palmifolia</i>	Palm Grass	#	exotic
<i>*Sida rhombifolia</i>	Paddy's Lucerne	#	
<i>Sloanea australis</i>	Maiden's Blush		
<i>*Solanum nigrum</i>	Black-berry nightshade		exotic
<i>*Solanum mauritianum</i>	Wild Tobacco	#	exotic
<i>Stenocarpus sinuatus</i>	Firewheel Tree		planted
<i>Sterculia quadrifida</i>	Peanut Tree	8S Wardell	planted
<i>Streblus brunonianus</i>	Whalebone Tree		
<i>*Syagrus romanzoffianum</i>	Cocos Palm	#	exotic
<i>Symplocos thwaitesii</i>	Buff Hazelwood		
<i>Syncarpia glomulifera</i>	Turpentine		planted
<i>Syzygium australe</i>	Brush Cherry		planted
<i>Syzygium crebrinerve</i>	Purple Cherry		
<i>Syzygium francisii</i>	Giant Water Gum		planted
<i>Syzygium ingens</i>	Red Apple		
<i>Syzygium paniculatum</i>	Magenta Lilly Pilly		planted
<i>Syzygium smithii</i> (normal form)	Lilly Pilly		
<i>Syzygium smithii</i> (small-leaved form)	Small-leaved Lilly Pilly		planted
<i>Tabernaemontana pandacaqui</i>	Banana Bush		
<i>*Tagetes minuta</i>	Stinking Roger	#	exotic
<i>Toechima dasyrrhache</i>	Blunt-leaved Steelwood		
<i>Toona ciliata</i>	Red Cedar		
<i>*Tradescantia fluminensis</i>	Wandering Dew	#	exotic
<i>Trichosanthes subvelutina</i>	Silky Cucumber	3RC-	
<i>Triunia youngiae</i>	Spice Bush		
<i>*Verbena bonariensis</i>	Purple Top	#	exotic
<i>Wikstroemia indica</i>	Red-fruited Rice-flower		
<i>Wilkiea austroqueenslandica</i>	Smooth Wilkiea	8S Buckombil	
<i>Wilkiea huegeliana</i>	Veiny Wilkiea		

9 Weed List

Table 7: Weeds found at McLeods Shoot in 2006

<u>Scientific Name</u>	<u>Common Name</u>
* <i>Ageratina riparia</i>	Mistweed
* <i>Anredera cordifolia</i>	Madeira Vine, Potato Vine Broad-leaved Carpet
* <i>Axonopus compressus</i>	Grass
* <i>Bidens pilosa</i>	Farmer's Friend
* <i>Chloris gayana</i>	Rhodes grass
* <i>Cinnamomum camphora</i>	Camphor Laurel
* <i>Conyza bonariensis</i>	Fleabane
* <i>Digitaria ciliaris</i>	Summer Grass
* <i>Ficus elastica</i>	Rubber Tree
* <i>Gomphocarpus fruticosus</i>	Cotton Bush
<i>Lantana camara</i>	Lantana
* <i>Ligustrum lucidum</i>	Large-leaved Privet
* <i>Ligustrum sinense</i>	Small-leaved Privet
* <i>Macroptilium atropurpureum</i>	Siratro
* <i>Melinis minutiflora</i>	Molasses Grass
* <i>Melinis repens</i>	Red Natal Grass
* <i>Paspalum urvillei</i>	Giant Paspalum
* <i>Paspalum wettsteinii</i>	Broad-leaved Paspalum
* <i>Passiflora suberosa</i>	Corky Passionflower
* <i>Passiflora subpeltata</i>	White Passionflower
* <i>Pellaea viridis</i>	a South African fern
* <i>Phytolacca octandra</i>	Inkweed
* <i>Sansevieria trifasciata</i>	Mother in law tongue's
* <i>Schefflera actinophylla</i>	Umbrella Tree
* <i>Schinus terebinthifolia</i>	Broad-leaved pepper tree
* <i>Senna pendula var. glabrata</i>	Winter Senna
* <i>Setaria palmifolia</i>	Palm Grass
* <i>Sida rhombifolia</i>	Paddy's Lucerne
* <i>Solanum nigrum</i>	Black-berry nightshade
* <i>Solanum mauritianum</i>	Wild Tobacco
* <i>Syagrus romanzoffiana</i>	Cocos Palm
* <i>Tagetes minuta</i>	Stinking Roger
* <i>Tradescantia fluminensis</i>	Wandering Dew
* <i>Verbena bonariensis</i>	Purple Top

10 Weed Control Methods

The weed control methods described below are sourced from Byron Shire's *Environmental Weed Control Guidelines* (Landmark Ecological Services and Bower Bush Works, *in press*). These methods are also described in the Big Scrub Rainforest Group publications, *Common Weeds of Northern NSW Rainforests* (2000) and *Subtropical Rainforest Restoration* (1998).

Herbicides, surfactants, and adjuvants must only be used by certified operators and in a manner that is consistent with product labels or with permits issued by the Australian Pesticides and Veterinary Medicine Authority (APVMA). Relevant APVMA permits include numbers 9158 and 9907.

Table 9: Specific control techniques for weeds at McLeods Shoot

Scientific Name	Common Name	Control Techniques
<i>Ageratina riparia</i>	Mistweed	<p>Seedlings/small infestations: Carefully hand remove, ensure to remove all rootlets which can easily break and rapidly re-shoot; or cut and paint stems with glyphosate & water at 1:1.5, or spot spray. In moist habitats place material off the ground to avoid re-shooting/propagation. Herbicide applications: Foliar spray plant with glyphosate & water at 1:75 (13.3ml/L) or 1:100 (10ml/L) during good growing season, or metsulfuron methyl & water at 1.5g /10 L. In restoration sites undertake spray preparation by hand removing from around ferns and seedlings or pruning back leaves of non target species. To avoid impacts to native grasses or pasture during spray treatments use metsulfuron methyl only.</p> <p>Control well before flowering in Winter/August. Young seed heads may mature and remain viable after control.</p>
<i>Anredera cordifolia</i>	Madeira Vine	<p>Established infestations of Maderia Vine require a long term integrated approach involving hand based control methods, spraying and regular follow-up.</p> <p>Tuberlings/tubers: Hand remove tuber/tuberlings by carefully prising up or excavating ground tuber. Bag and compost all parts of the plant. Vines: Scrape vine to about 1/3 diameter of the stem and paint IMMEDIATELY with straight glyphosate (100%). Scrape from ground level working up the vine. Scrape at least 40cm sections at a time, scraping as much length of the vine as possible. This technique allows herbicide to trans-locate through the vine and impact the aerial tubers which will shrivel within a few months time. DO NOT sever the vine stem, as it will stay alive in the tree, or will desiccate and the aerial tubers will remain alive, dropping to the ground over a period of time. Scrape and paint vine stems that may have been severed by past floods or poor past practise. Ground tuber: tubers attached to vines will regrow if they are not treated as part of the scrape and paint technique. Expose ground tuber and gouge or create wells and paint with glyphosate (100%). Young plants and vines: foliar spray with metsulfuron methyl & water (e.g. Brushkiller®) at 1.5g/10L + non ionic surfactant (Li-700® or Pulse®) &/or glyphosate & water at 1:50 (20ml/L) with surfactant</p>

		(Li-700® or Pulse®), or fluroxypyr (Starane®) with water at 4ml/L -(wet leaves and stems). Spraying of ground tuberlings may be undertaken as an initial step prior to vine treatment, to avoid trampling of tuberlings. Regular follow-up will be crucial for the effective control of Maderia Vine. In heavy infestations a 3 monthly spray program will be required to address regrowth of tubers as spraying only kills a portion of large tuber at a time (at least 5 - 10 years of regular follow-up may be required).
<i>Axonopus compressus</i>	Broad-leaved Carpet Grass	Small infestations: Crown out individual plants or spot spray. Large infestations: foliar spray with glyphosate & water at 1:75 (13.3ml/L) + surfactant. Cover foliage well. Plant will readily recover from untreated culms. NB: avoid using spray adjuvants/additives in areas of frog habitat.
<i>Chloris gayana</i>	Rhodes Grass	Small infestations: Crown out individual plants or spot spray. Large infestations: foliar spray with glyphosate & water at 1:75 (13.3ml/L) + surfactant. Cover foliage well. Plant will readily recover from untreated culms. NB: avoid using spray adjuvants/additives in areas of frog habitat.
<i>Cinnamomum camphora</i>	Camphor Laurel	Seedlings/saplings: handpull, or spot spray with metsulfuron methyl at 1.5g/10L &/ or glyphosate & water at 1:50 (20ml/L) + surfactant (e.g. Li-700®). The use of surfactant is important when spraying seedlings. Metsulfuron methyl improves the effectiveness of glyphosate based spray applications on larger seedlings to small saplings; or cut & paint stump with glyphosate & water at 1:1.5. Shrubs/trees: cut stump, or stem inject (use hatchet, drill, sidewinder, chainsaw) (with mix noted above). Hatchets are best used on smaller trees with thin bark and should be avoided on large deep barked trees. Stem injection with chainsaw: ensure cuts are short and neat and that they overlap and penetrate deep into tree (at least 3-5cm). Chainsaw based control tends to use a higher quantity of mix owing to larger sized cuts. A lower ratio of glyphosate can be used e.g. 1 part glyphosate to 2 parts water (1:2 or 1:3) and applied with a spray pack. This enables quicker filling and re-filling of cuts. A drill powered by a generator provides a quick safe method of control. NB: Stands of Camphor Laurels may have co-joined roots. The treatment of a individual Camphor within a stand may result in the translocation of herbicide to untreated camphors resulting in their total or partial control. However this will not impact other tree species (if herbicide application is applied correctly). Other methods may include basal bark or spraying with Garlon®
<i>Ficus elastica</i>	Rubber Tree	Mature trees: trial stem injection with glyphosate (undiluted). Stack any cut stems off the ground to dry.
<i>Lantana camara</i>	Lantana	Seedlings/individual bushes: handpull, or cut, scrape & paint stump with glyphosate & water at 1:1.5, or foliar spray with glyphosate & water at 1:100 (10ml/L) + surfactant, ensure to cover foliage well. In drier environments or poor growing season spray glyphosate & water at 1:50 (20ml/L) + surfactant. Dense Lantana thicket: foliar spray or apply herbicide with a splatter gun (i.e. phillips forestry kit) with glyphosate & water at

		1:9 + sticker oil (i.e. 500ml glyphosate per 4.5L water). The splatter gun delivers a narrow stream/splatter of herbicide which should be applied every 1 - 1.5m of bush using 2 x 2ml per 0.5m of bush (treat both sides of the bush). This allows for the translocation of herbicide to un-treated parts of the plant and will also impact aerial growth associated to treated portions. Dead lantana thicket: Oversprayed Lantana thicket can be left insitu to allow regeneration of trees underneath or otherwise cut down with a brush-hook to improve site access for follow-up management. Vine weeds often establish under the thicket.
<i>Ligustrum lucidum</i>	Large-leaved Privet	Seedlings/saplings: handpull or spot spray or cut & paint with glyphosate & water at 1:1.5. Dense infestations of saplings: cut back foliage and spray regrowth with glyphosate at 1:50 (20ml/L) &/or metsulfuron methyl at 1.5g/10L + non ionic surfactant (e.g. Agral®), or over spray. Larger plants up to 3m tall can be foliar sprayed with metsulfuron methyl however complete spray /leaf coverage is required as plants will reshoot. Shrubs/trees: cut, scrape & paint or stem inject via drill or hatchet, fill cuts with glyphosate & water at 1:1.5. Cut sections of Privet stem will take root if left on the ground in moist environments. Place cut stems off the ground to dry or undertake stem injection where practical.
<i>Ligustrum sinense</i>	Small-leaved Privet	Seedlings/saplings: handpull or spot spray or cut & paint with glyphosate & water at 1:1.5. Dense infestations of saplings: cut back foliage and spray regrowth with glyphosate at 1:50 (20ml/L) &/or metsulfuron methyl at 1.5g/10L + non ionic surfactant (e.g. Agral®), or over spray. Larger plants up to 3m tall can be foliar sprayed with metsulfuron methyl however complete spray /leaf coverage is required as plants will reshoot. Shrubs/trees: cut, scrape & paint or stem inject via drill or hatchet, fill cuts with glyphosate & water at 1:1.5. Cut sections of Privet stem will take root if left on the ground in moist environments. Place cut stems off the ground to dry or undertake stem injection where practical.
<i>Macroptilium atropurpureum</i>	Siratro	<u>Seedlings and blanketing foliage</u> : dig up/hand remove, or foliar spray with glyphosate & water at 1:50 (20ml/L) + surfactant &/or metsulfuron methyl at 1.5g/10L + non ionic surfactant. Roll down/unwind foliage for spraying where practical. To avoid impacts to native grasses or sedges use only metsulfuron methyl spray mix. . <u>Aerial stems</u> : cut, scrape & paint vine stem with glyphosate & water at 1:1.5 + metsulfuron methyl & water at 10g/L, scrape and paint tuberous root/stem also.
<i>Melinis minutiflora</i>	Molasses Grass	Foliar spray with glyphosate & water at 1:100 (10ml/L). Plant forms dense layer and may require repeated treatments.
<i>Melinis repens</i>	Red Natal Grass	Foliar spray with glyphosate & water at 1:100 (10ml/L).
<i>Paspalum urvillei</i>	Giant Paspalum	Small infestations: Crown out individual plants or spot spray. Large infestations: foliar spray with glyphosate & water at 1:75 (13.3ml/L) + surfactant. Cover foliage well. Plant will readily recover from untreated culms. NB: avoid using spray adjuvants/additives in areas of frog habitat.

<i>Paspalum wettsteinii</i>	Broad-leaved Paspalum	Small infestations: Crown out individual plants or spot spray. Large infestations: foliar spray with glyphosate & water at 1:75 (13ml/L) + surfactant. Cover foliage well. This plant establishes a large soil seed bank. Regular follow-up control of seedling regeneration will be required every few months to exhaust the seed bank.
<i>Passiflora suberosa</i>	Corky Passionflower	Small infestations: Cut, scrape & paint stem with glyphosate & water at 1:1.5 or carefully handpull or prise up seedlings & small vines. Larger infestations: use a combination of handweeding, pulling down vines and foliar spraying with glyphosate & water at 1:50 (20ml/L) + metsulfuron methyl & water at 1.5g/10L + non ionic surfactant + sticker. Avoid using glyphosate spray mix in areas with native grasses. The foliage on this vine has a very waxy coating therefore a penetrant & sticker oil is essential. Cover foliage well.
<i>Passiflora subpeltata</i>	White Passionflower	Small infestations: Collect fruits and destroy. Cut, scrape & paint stem with glyphosate & water at 1:1.5 or carefully handpull or prise up seedlings, small vines. Lateral roots are divided into two sections and will readily break and reshoot. Larger infestations: use a combination of handweeding, pulling down vine vines and foliar spraying with glyphosate & water at 1:50 (20ml/L) + metsulfuron methyl & water at 1.5g/10L + non ionic surfactant + sticker. Avoid using glyphosate spray mix in areas with native grasses. The foliage on this vine has a very waxy coating therefore a penetrant & sticker oil is essential. Cover foliage well.
<i>Phytolacca octandra</i>	Inkweed	Handpull; cut, scrape & paint stem with glyphosate & water at 1:1.5; spot-spray with glyphosate at 1:100. Care should be taken with sap as it can cause skin irritation.
<i>Sansevieria trifasciata</i>	Mother-in-law's Tongue	Individual plants: dig up rhizome and hang up to dry out. Dense thicket: foliar spray glyphosate & water at 1:50 (20ml/L) &/or metsulfuron methyl at 1.5g/10L of water + non ionic surfactant or trial wipe of foliage with metsulfuron methyl & water at 10g/1L, or glyphosate & water at 1:20 + sticker.
<i>Schefflera actinophylla</i>	Umbrella Tree	Seedlings/saplings: handpull or cut, scrape & paint with glyphosate & water at 1:1.5 or foliar spray with glyphosate & water at 1:50 (20ml/L) + metsulfuron methyl at 1.5g/10L + non ionic surfactant. Shrubs: cut, scrape & paint stump or stem inject. Hang cut stems off the ground, do not sit back on cut stump or lay on ground to avoid re-shooting. Paint end of cut stump with herbicide. Aerial/epiphytic plants: Do not cut aerial roots/stems but leave intact and scrape and paint. The plant may stay alive if stems are cut and adequate growing medium is available in the host tree's crotch.
<i>Schinus terebinthifolia</i>	Broad-leaved Pepper Tree	Seedlings: Carefully handpull or prise up, ensure to remove deep tap root. Saplings/shrubs: cut, scrape & paint or stem inject with glyphosate & water at 1:1.5 + metsulfuron methyl & water at 10g/1L or basal bark with fluroxypyr (Starane®) at 35ml/L with diesel. For basal bark application ensure stem is dry and free of dirt; apply mix over entire circumference of stem for at least 30cm high; increase height of application with increasing stem diameter greater than 10cm. Avoid using cut and paint technique on shrubs and small trees as this plant readily coppices from damaged stems,

		alternatively use stem injection and basal bark technique.
<i>Senna pendula</i> var. <i>glabrata</i>	Winter Senna	Seedlings: handpull or spot spray. Shrubs: cut, scrape & paint stump, or stem inject with glyphosate & water at 1:1.5. Dense thicket: foliar spray with glyphosate & water at 1:100 (10ml/L) + surfactant.
<i>Setaria palmifolia</i>	Palm Grass	Small infestations: crown out or spot spray. Large infestations: foliar spray with metsulfuron methyl at 1.5gms/10L &/or glyphosate & water at 1:50 (20ml/L) + surfactant. Ensure to cover foliage well.
<i>Solanum nigrum</i>	Black-berry Nightshade	Small infestations: hand pull or spot spray. Large infestations: foliar spray with glyphosate at 1:100.
<i>Solanum mauritianum</i>	Wild Tobacco	Seedlings: handpull or spot spray with glyphosate & water at 1:100 (10ml/L) with surfactant. Shrubs: cut, scrape & paint stump, or stem inject with glyphosate & water at 1:1.5.
<i>Syagrus romanzoffianum</i>	Cocos Palm	Seedlings: knife out or spot spray with metsulfuron at 1.5g/10L + non ionic surfactant & glyphosate at 1:50 (20ml/L). Larger trees: remove crown or head of palm (i.e.section from below the sheathing bases of fronds) or drill and inject basal stem with glyphosate and water at 1:1.5 NB: seedlings can be difficult to control by foliar spray, trial wipe application of metsulfuron methyl & water at 10g/1L or glyphosate & water at 1:20 + sticker.
<i>Tradescantia fluminensis</i>	Trad; Wandering Dew	Small infestations: carefully handweed, prise up all adventitious roots, bag all portions of plant and compost. Larger infestations: trial raking back, or spray with glyphosate & water at 1:50 (20ml/L) & surfactant, or fluroxypyr (Starane®) & water (see label) & spray oil. Ensure to cover all foliage well including growing tips. Repeated treatments may be required. As infestation declines, spot spray or hand remove.
<i>Verbena bonariensis</i>	Purple Top	Small infestations: handpull or spot spray with glyphosate at 1:100. Large infestations: foliar spray with glyphosate at 1:100.

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