Office of Environment & Heritage
NSW National Parks & Wildlife Service

Northern Tablelands Region

Draft Regional Pest Management Strategy

Part B: 2012-2015

This plan should be cited as follows:

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Summary

Northern Tablelands Region has significant diversity in bio-geographic landscapes ranging from sub-tropical rainforests on the eastern escarpment through open woodlands and high altitude wetlands to Spinifex communities on the western slopes. This diversity is reflected in the wide range of pest animal and weed issues currently identified across the 91 reserves managed by the Region.

The Region gives highest priority to the control of pest species that have the potential to impact on either threatened native species or on adjoining agricultural enterprises. Priority is also given to pest programs that target new or emerging highly invasive pest species.

Wild dogs, due primarily to their predation of livestock, are a critical priority pest animal for the region. The region works very closely with the local Livestock Health and Pest Authorities and 19 Wild Dog Control Associations, utilising an integrated suite of control measures including aerial and ground baiting, trapping, shooting and barrier fencing to manage the issue.

In the western part of the region, a priority is given to control feral pigs and feral goats due to their impact on the conservation values of the reserves and on neighbouring agricultural enterprises. Deer are an emerging pest species that are rapidly increasing in distribution and density, particularly in the northern and western parts of the region.

Foxes, a major environmental and agricultural pest, are managed on a landscape basis. Apart from baiting on park, the region has provided ongoing support to the Southern New England Landcare Coordinated Fox Control Program. The program has been running for 14 years and is supported by 30 community groups, covering over 300 properties.

Lantana has been identified as a significant threat to the World Heritage listed dry rainforest reserves and control is a high priority for the region. Other weeds given a high priority include blackberry, perennial grasses, Cats Claw Creeper, Tree of Heaven, Honey Locust and St John's Wort.

The highest priority is given to preventing new weed species from becoming established in reserves. Tropical Soda Apple was identified in the Macleay catchment, including two NTR reserves, in 2010. With the aim of eradication, an ongoing program has been developed in close cooperation with the local Weeds Authorities to locate, map and destroy the plant.

Wherever possible, a landscape approach is taken to the control of pest species. Integrated pest programs are professionally carried out in close cooperation with key stakeholders.

Acronyms

The following acronyms are used throughout this document.

Acronym	Expanded Text
AMS	Asset Maintenance System
BPWW	Biodiversity Priorities for Widespread Weeds
CAP	Catchment Action Plan
CMA	Catchment Management Authority
DECCW	NSW Department of Environment, Climate Change & Water
EEC	Endangered Ecological Community
GVTE	Goat Vulnerable Threatened Entities
KPI	Key Performance Indicator
KTP	Key Threatening Process under the TSC Act
LGA	Local Government Area
LHPA	Livestock Health and Pest Authority
MER	Natural Resource Management Monitoring, Evaluation and Reporting
NP	National Park
NPW Act	*National Parks and Wildlife Act 1974*
NPWS	NSW National Parks and Wildlife Service
NR	Nature Reserve
NRM	Natural Resource Management
NSW	New South Wales
OEH	Office of Environment and Heritage
PAS	Priorities Action Statement
PMP	Park Management Program
POM	Plan of Management
PWG	Parks and Wildlife Group, the internal name within OEH for NPWS
PWIS	Pest and Weed Information System
RLP Act	*Rural Lands Protection Act 1998*

Acronyms continued

ROP	Regional Operations Plan
RPMS	Regional Pest Management Strategy
SCA	State Conservation Area
SOP	Standard Operating Procedure
TAP	Threat Abatement Plan
TSC Act	*Threatened Species Conservation Act 1995*
WDCA	Wild Dog Control Association

1. Introduction

Pest management within the Office of Environment and Heritage (OEH) is guided by two core planning instruments:

- *NSW 2021 – A Plan to Make NSW Number One* sets out performance targets, including a specific priority action within *Goal 22 Protect Our Natural Environment* which is to *address core pest control in National Parks through the delivery of NPWS Regional Pest Management Strategies and improve educational programs and visitor access*.
- The *NSW Invasive Species Plan* provides specific goals, objectives and actions in relation to Invasive Species management.

This document is Part B of the Northern Tablelands Region Pest Management Strategy and contains the regionally specific components of the strategy including the Region's prioritised pest programs.

Part A of the strategy provides the broader planning framework for the management of pests by NPWS. It documents the corporate environment, legislation and policy context and describes the logic used for identifying, prioritising and monitoring pest management programs. It also establishes Service-wide pest management goals, objectives and actions.

This Part B describes the local circumstances within the Region and applies the Part A framework to prioritise specific pest management programs. These priorities will be included in Regional Operations Plans (ROPs) and implemented through the Asset Maintenance System (AMS). It also broadly identifies pest distribution and associated impacts across the Region.

2. Regional overview

The NPWS Northern Tablelands Region covers an area of approximately 51,000 square kilometres of northern New South Wales. The Region stretches from the NSW-Queensland border in the north, to below Walcha and Tamworth in the south and from around Warialda/Gunnedah in the west to half way down the escarpment in the east.

The Northern Tablelands Region reserve system is comprised of 37 National Parks, 31 Nature Reserves, 21 State Conservation Areas and 2 Aboriginal Area. The 91 reserves protect an area in excess of 603,000 hectares.

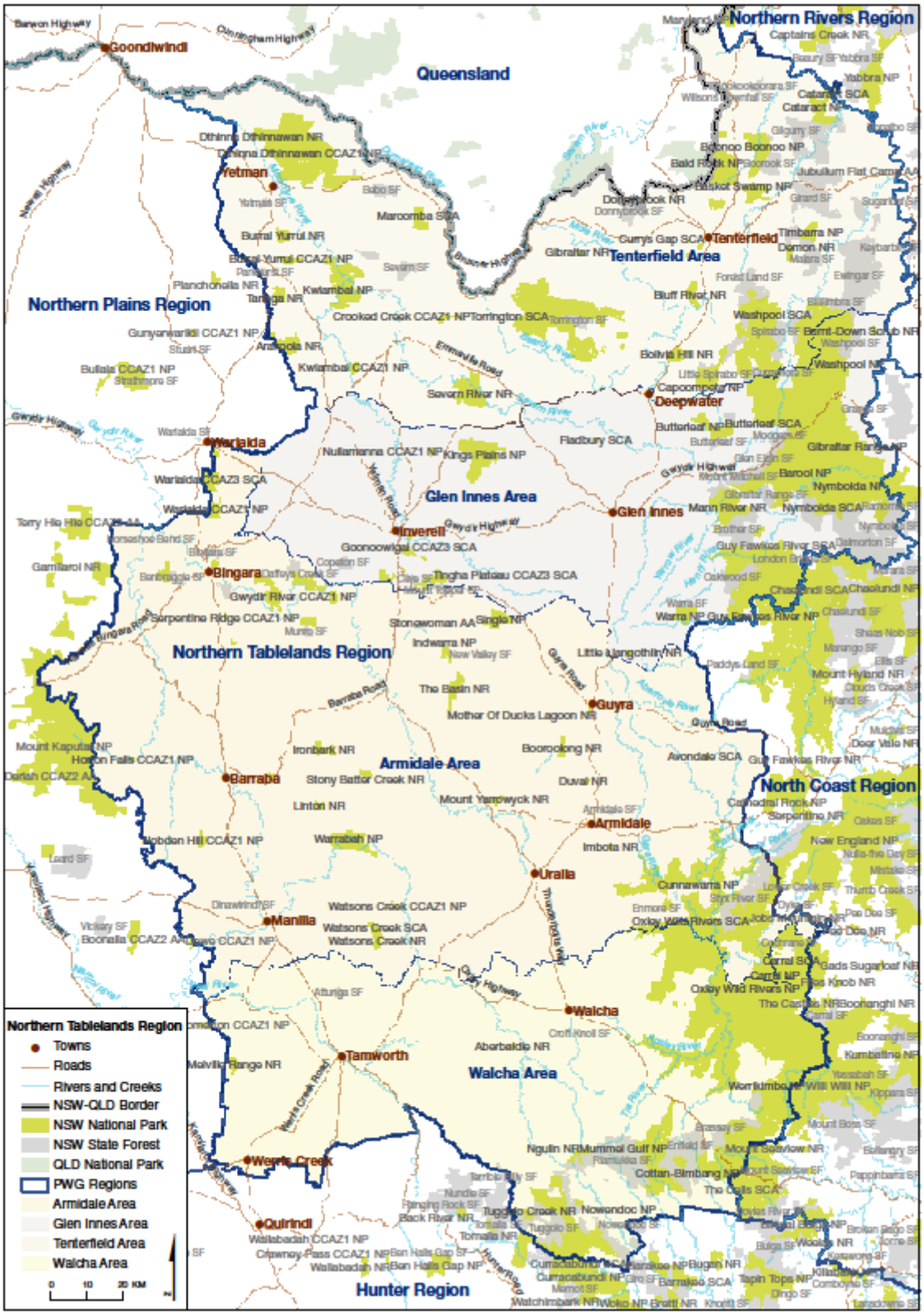
The reserves on the eastern gorge country are well known for their conservation values and wild and scenic features. The reserves on the tableland and north-west slope areas conserve unique areas of the landscape and high conservation remnants of the original New England Tableland and Nandewar bio-regions.

The Region contains significant bio-geographic landscapes ranging from sub-tropical, warm temperate and dry rainforest, open woodlands, isolated granite outcrops supporting unique vegetation to wetland communities. Much of the Northern Tableland Region's landscape has been modified by farming and urban development but significant areas have been conserved in the reserves managed by the NPWS.

The Northern Tablelands Region continues to develop important partnerships with reserve neighbours, communities in adjoining towns and villages, local government, the Rural Fire Service, Livestock Health and Pest Authorities, Wild Dog Control Associations, Forests NSW, local members of NSW Parliament, conservation groups, neighbours and other special interest groups.

The Region is resourced to deliver work programs with a Regional office and an Operational Support and Coordination Unit in Armidale and four Area offices with workshop/depots in Tenterfield, Glen Innes, Armidale and Walcha and depots in Bingara and Yetman.

3. Regional map - Northern Tablelands Region



4. Regional prioritisation

The following key factors are considered when determining priorities for pest management within the Region. However, a precautionary approach using risk management (as described in the risk management policy) will be applied where there is uncertainty about the impacts of the pest to the asset. The feasibility of effective control will also be a consideration.

Critical priority

C-TSC (Threatened Species Conservation):

Programs targeting pests which are, or are likely to be, significantly impacting on threatened species/populations/communities. These include the highest priorities identified in the TAPs, PAS and BPWW.

C-HD (Health and Disease)

Programs that target pests which impact significantly on human health or are part of a declared national emergency e.g. outbreak of foot and mouth disease or control of feral pigs in the catchment area of a domestic water supply reservoir;

C-EC (Economic)

Programs targeting pests that impact significantly on economic enterprises e.g. wild dog control where there is potential for significant stock losses as identified in Wild Dog Management Plans;

C-NE (New and Emerging)

Programs addressing new occurrences or suppressed populations of highly invasive pest species with potential for significant impacts on park values (subject to risk/feasibility assessment), programs to control Class 1 and 2 noxious weeds;

High priority

H-IH (International Heritage)

Programs that target pests that impact significantly on World Heritage or international heritage values, e.g. control of lantana impacting on World Heritage Central Eastern Rainforest Reserves of Australia;

H-CH (Cultural Heritage)

Programs targeting pests that impact significantly on important cultural heritage values e.g. control of feral goats where they are inhabiting an area containing Aboriginal rock art; control of rabbits undermining an historic building;

Medium priority

M-WNH (Wilderness and National Heritage)

Programs that target pests that impact significantly on Wilderness, Wild Rivers, national heritage values or other important listed values e.g. control of willows along a declared Wild River or within a Wilderness area;

M-RA (Recreation and aesthetic values)

Programs that target pests that impact significantly on recreation, landscape or aesthetic values, e.g. control of blackberry on the margins of camping areas; control of weeds in an area of natural beauty that is visited frequently;

M-CP (Cooperative programs)

Cooperative programs (not covered in higher priorities above) targeting pests that impact significantly on park values or agricultural production (including the control of Class 3 noxious weeds or implementation of other endorsed state or regional plan), e.g. control of Coolatai Grass across boundaries as part of a regional control plan prepared by a regional weeds advisory committee and supported by NPWS.

Lower priority

L-LP (Localised programs)

Programs targeting pests that have localised impacts on natural ecosystems or agricultural lands that promote community skills, awareness and involvement with parks, e.g. participation in a new bush regeneration project with a local community group for control of Class 4 noxious weeds;

L-PP (Previous programs)

Previous programs targeting pests that have localised impacts on native species and ecosystems, and that can be efficiently implemented to maintain program benefits, e.g. the maintenance of areas treated previously for serrated tussock to continue keeping them weed free.

In some circumstances, new programs may be introduced, or priority programs extended to target pests where a control "window of opportunity" is identified e.g. where burnt areas become more accessible for ground control of weeds; where drought makes control of feral pigs and feral goats more efficient because they congregate in areas where water is available; or when a new bio-control agent becomes available.

Future priorities for pest control will need to reflect changes in the distribution, abundance or impacts of pests that may occur in response to environmental changes including climate change. NPWS is supporting research to understand the interaction between climate change, pests and biodiversity.

5. Table of prioritised regional pest programs

Live versions of this table will be kept on OEH intranet and updated annually over the 4 year period of the strategy.

Table of prioritised regional pest programs – Armidale Area

Area	Reserve(s)	Site names	Target pests or weeds	Asset at risk	Aim of Control	Action	Priority
Armidale	OWRNP	Raspberry Road Precinct -Top Ck, East Kunderang, Macleay R, Kunderang Brook, Chandler River	Lantana	Gondwana dry rainforest (world heritage) riparian zones, open woodland. Cynachum elegans (EPBC-e; TSC-e), Dry Rainforest EEC (TSC-e) [WHA]. BMAD	Asset protection	Foliar spraying	C-TSC
Armidale	OWRNP	Raspberry Road Precinct -Top Ck, East Kunderang, Macleay R, Kunderang Brook, Chandler River	Blackberry	Gondwana dry rainforest (world heritage) riparian zones, open woodland. Cynachum elegans (EPBC-e; TSC-e), Dry Rainforest EEC (TSC-e) [WHA]	Asset protection	Foliar spraying	C-TSC
Armidale	OWRNP	Raspberry Road Precinct	Giant Parramatta Grass	Woodlands, Forest - EECs	Containment	Foliar spraying	C-NE
Armidale	OWRNP	All of park	Prickly Pear	Riparian zones, Woodland - EECs	Asset protection	Foliar spray, Bio Control	M-WNH
Armidale	OWRNP	All riparian zones	Blue Heliotrope	Riparian zones - EECs	Asset protection	Bio Control	M-WNH
Armidale	OWRNP	All riparian zones	Willow	Riparian zones - EECs	Eradication	Stem injection	M-WNH
Armidale	OWRNP	Macleay / Chandler Rivers	Tree of Heaven	Riparian zones - EECs	Eradication	foliar spraying, Stem injection, basal bark	C-NE
Armidale	OWRNP	Gara Gorge	Privet	Riparian zones, Woodland - EECs	Containment	Foliar spraying Stem injection, basal bark, Cut stump	M-WNH
Armidale	OWRNP	Gara Gorge, Salisbury Waters,	African Love Grass	Riparian zones, Woodland, EECs	Containment	Foliar spraying, manual removal	M-WNH
Armidale	OWRNP	All of park	Xanthium	Riparian zones - RRCs	Asset protection	Foliar spraying	M-WNH

Area	Reserve(s)	Site names	Target pests or weeds	Asset at risk	Aim of Control	Action	Priority
Armidale	Cunnawarra NP	All of park	Lantana	Gondwana dry rainforest (world heritage) riparian zones, open woodland.	Asset protection	Foliar spraying	C-TSC
Armidale	Cunnawarra NP	All of park	Tropical Soda Apple	Gondwana dry rainforest (world heritage) riparian zones, open woodland.	Asset protection	Monitoring, foliar spraying, manual removal	C-NE
Armidale	Cunnawarra NP	All of park	Xanthium	Riparian zones - EECs	Asset protection	foliar spraying	M-WNH
Armidale	Georges Creek NR	All of park	Tropical Soda Apple	Gondwana dry rainforest (world heritage) riparian zones, open woodland. EECs	Asset protection	Monitoring, foliar spraying, manual removal	C-NE
Armidale	Georges Creek NR	All of park	Lantana	Gondwana dry rainforest (world heritage) riparian zones, open woodland. EECs	Asset protection	Foliar spraying	C-TSC
Armidale	Georges Creek NR	Creek catchments	Blackberry	Gondwana dry rainforest (world heritage) riparian zones, open woodland. EECs	Asset protection	Foliar spraying	C-TSC
Armidale	Georges Creek NR	All riparian zones	Blue Heliotrope	Riparian zones	Asset protection	Bio Control	L-LP
Armidale	Georges Creek NR	All of park	Xanthium	Riparian zones	Containment	Spot spraying	L-LP
Armidale	Georges Creek NR	Kempsey Road	Giant Parramatta Grass	Wood Lands, Forest	Containment	Spot spraying, physical removal	M-WNH
Armidale	All Reserves	All of park	Phytophthora	Reduce/minimise of impact on native flora and fauna - EECs	Asset protection	Minimise spread with hygiene methods and closure of affected areas	C-NE
Armidale	All Reserves	All of park	Myrtle rust	Eucaypt forests and woodlands EECs	Asset protection	Minimise spread with hygiene methods and closure of affected areas	C-NE
Armidale	OWRNP	All of park	Wilds dogs	Adjacent livestock enterprises	Asset protection	Aerial baiting, ground baiting, trapping, exclusion fencing, shooting,	C-EC

Area	Reserve(s)	Site names	Target pests or weeds	Asset at risk	Aim of Control	Action	Priority
Armidale	OWRNP	All of park	Feral pigs	Gondwana dry rainforest (world heritage) riparian zones, open woodland. Cynachum elegans (EPBC-e; TSC-e), Dry Rainforest EEC (TSC-e) [WHA]	Asset protection	Trapping, aerial/ground shooting, poisoning	C-TSC
Armidale	OWRNP	All of park	Feral goats	Cynachum elegans (EPBC-e; TSC-e), Dry Rainforest EEC (TSC-e) [WHA], Threatened spp. BTRW	Asset protection	Aerial/ground shooting	C-TSC
Armidale	OWRNP	All of park	Foxes	Threatened spp. - Brush-tailed Rock Wallaby, Spotted-tailed Quoll, Adjacent livestock enterprises.	Asset protection.	Aerial/ground shooting, baiting, trapping	C-TSC
Armidale	OWRNP	All of park	Rabbit	Identified KTP – EEC, native flora. Reduce soil erosion. Provision of food source for cats and foxes	Asset protection	Baiting, fumigating, ripping, bio control, shooting	C-TSC
Armidale	OWRNP	All of park	Feral cat	Identified KTP Various Threatened spp. incl. Hastings River Mouse.	Asset protection	Trapping, shooting.	C-TSC
Armidale	OWRNP	All of park	Deer	Macleay Gorges and the Kunderang Wilderness areas.	Containment	Ground shooting, aerial shooting,	C-NE
Armidale	OWRNP	Chandler / Macleay	Horses	Macleay Gorges and the Kunderang Wilderness areas - riparian zones.	Asset protection	Trapping and removal	H-IH
Armidale	OWRNP	All of park	Indian myna	Native bird species and other fauna	Containment	Ground shooting, trapping.	C-NE
Armidale	Bingara CCA SCA	All of park	Blackberry, St John's Wort , Coolatai Grass Blue Heliotrope, Box Thorn, Mother of Millions Prickly Pear	The Grassy White Box Endangered Ecological community, Eighteen Threatened Fauna species including the endangered Regent Honeyeater.	Asset Protection	Spot Spraying, physical removal, Bio-control	C-TSC
Armidale	Bingara CCA SCA	All of park	Feral goats, feral pigs, foxes, rabbits, feral cats.	The Grassy White Box EEC Eighteen Threatened Fauna species incl, endangered Regent Honeyeater.	Asset protection	Trapping, aerial shooting, baiting, fumigation	C-TSC
Armidale	Gwydir River CCA NP & SCA	All of park	Blackberry, Blue Heliotrope, Box Thorn Coolatai Grass, Salix spp., Tree of Heaven, Xanthium spp	EEC - Howell Shrublands,. Vulnerable plant Ooline (Cadellia pentastylis). Eleven threatened and other priority fauna spp. recorded	Asset protection	Spot Spraying, bio-control, stem injection/cut stump, basal bark	C-TSC

Area	Reserve(s)	Site names	Target pests or weeds	Asset at risk	Aim of Control	Action	Priority
Armidale	Gwydir River CCA NP & SCA	All of park	Feral goats, feral pigs, deer, foxes, rabbits, feral cats.	EEC - Howell Shrublands,. Vulnerable plant Ooline (Cadellia pentastylis). Eleven threatened and other priority fauna spp. recorded	Asset Protection	Aerial/ground shooting, trapping, baiting, fumigation	C-TSC
Armidale	Horton Falls CCA NP	All of park	Sweet Briar	Stringybark & Ironbark dominant forests and woodlands. Various vulnerable woodland species	Asset Protection	Spot spraying	M-RA
Armidale	Horton Falls CCA NP	All of park	Feral goats, feral cats, foxes	Stringybark & Ironbark dominant forests and woodlands. Various vulnerable woodland species	Asset Protection	Aerial and ground shooting, trapping, baiting	C-TSC
Armidale	Ironbark NR	All of park	Blackberry Coolatai Grass Prickly Pear spp. Salix spp.	Woodland/ Open forest containing 6 known ROTAPS and 8 recorded vulnerable or endangered fauna species, incl. Regent Honeyeater.	Asset Protection	Spot Spraying, bio-control, stem injection/cut stump	C-TSC
Armidale	Ironbark NR	All of park	Feral Goats, feral pigs, deer, foxes, rabbits, feral cats.	Woodland/open forest - 6 known ROTAPS and 8 recorded vulnerable or endangered fauna spp., incl. Regent Honeyeater.	Asset Protection	Aerial/ground shooting trapping, baiting	C-TSC
Armidale	Linton NR	All of park	Blackberry Coolatai Grass Prickly Pear spp. Sweet briar.	Woodland/ Open forest. with large and significant avifauna population Regent Honeyeater, Barking Owl. Border Thick-tailed Gecko..	Asset Protection	Spot spraying, bio-control	C-TSC
Armidale	Linton NR	All of park	Feral Goats, feral pigs, foxes, rabbits, feral cats.	Woodland/ Open forest. with large and significant avifauna population Regent Honeyeater, Barking Owl. Border Thick-tailed Gecko...	Asset Protection	Trapping, aerial/ground shooting, baiting fumigation	C-TSC
Armidale	Stony Batter Creek NR	All of park	Blackberry	Open woodland - habitat for Border Thick-tailed Gecko and Turquoise Parrot	Asset Protection	Spot spraying	M-CP
Armidale	Stony Batter Creek NR	All of park	Feral pigs, foxes, rabbits, feral cats.	Open woodland - habitat for Border Thick-tailed Gecko and Turquoise Parrot	Asset Protection	Trapping, aerial /ground shooting, baiting, fumigation	M-CP
Armidale	Warialda CCA NP & SCA	All of park	Box Thorn, Coolatai Grass,Prickly Pear sp	Open woodland - habitat for Border Thick-tailed Gecko, Turquoise Parrot	Asset Protection	Spot spraying, bio-control	M-CP

Area	Reserve(s)	Site names	Target pests or weeds	Asset at risk	Aim of Control	Action	Priority
Armidale	Warialda CCA NP & SCA	All of park	Feral pigs, feral goats, foxes, rabbits, feral cats.	Open woodland - habitat for Border Thick-tailed Gecko and Turquoise Parrot	Asset Protection	Trapping, aerial/ground shooting, baiting fumigation	M-CP
Armidale	Warrabah NP	All of park	Salix spp, Blackberry, Blue Heliotrope, Prickly Pear spp.,. Xanthium spp.	EEC Howell Shrublands + Acacia pubifolia. Rare Quinn's Mallee, Platypus, rare Namoi River Elseya, vulnerable Turquoise Parrot.	Asset Protection	Spot Spraying, bio-control, stem injection/cut stump	M-CP
Armidale	Warrabah	Visitor Area	Coolatai Grass	EEC Howell Shrublands	Asset protection	Spot spraying , chipping	C-NE
Armidale	Warrabah NP	All of park	Feral pigs, feral goats, foxes, rabbits, feral cats.	EEC Howell Shrublands + Acacia pubifolia. Rare Quinn's Mallee ,Platypus, rare Namoi River Elseya, vulnerable Turquoise Parrot.	Asset Protection	Trapping, aerial/ground shooting, baiting fumigation	C-TSC
Armidale	Hobden Hill NP	All of park	Box Thorn, Coolatai Grass, Prickly Pear spp., St. John's Wort, Xanthium spp.	White Box, Yellow Box, Blakely's Red Gum Woodland.	Asset Protection	Spot Spraying, bio-control, stem injection/cut stump	C-TSC
Armidale	Hobden Hill NP	All of park	Feral pigs, feral goats, foxes, rabbits, feral cats.	White Box, Yellow Box, Blakely's Red Gum woodland.	Asset Protection	Trapping, aerial/ground shooting, baiting, fumigation	C-TSC
Armidale	Serpentine Ridge NP	All of park	Box Thorn, Coolatai Grass, Prickly Pear spp., St. John's Wort Xanthium spp.	New reserve with diversity of habitats incl. hummock grassland / open woodland on sepentinite ridges and Ironbark open forests	Asset Protection	Spot Spraying, bio-control, stem injection/cut stump	C-TSC
Armidale	Serpentine Ridge NP	All of park	Feral pigs, feral goats, foxes, rabbits, feral cats.	New reserve with diversity of habitats incl. hummock grassland / open woodland on sepentinite ridges and Ironbark open forests	Asset Protection	Trapping, aerial/ground shooting, baiting, fumigation	M-CP
Armidale	Woodsreef SCA	All of park	Box Thorn, Coolatai Grass, Prickly Pear spp., St. John's Wort Xanthium spp.	New reserve with diversity of habitats incl. hummock grassland / open woodland on sepentinite ridges and Ironbark open forests	Asset Protection	Spot Spraying, bio-control, stem injection/cut stump	M-CP

Area	Reserve(s)	Site names	Target pests or weeds	Asset at risk	Aim of Control	Action	Priority
Armidale	Woodsreef SCA	All of park	Feral pigs, feral goats, foxes, rabbits, feral cats.	New reserve with diversity of habitats incl. hummock grassland / open woodland on sepentinite ridges and Ironbark open forests	Asset Protection	Trapping, aerial/ground shooting, baiting, fumigation	M-CP
Armidale	Avondale SCA	All of park	Blackberry	Very significant open woodland for bird species - vulnerable Eastern False Pipistrelle, Barking Owl. Eastern Bent-wing Bat, Long-nosed Potoroo, Eastern Cave Bat.	Asset protection	Spot spraying	C-TSC
Armidale	Avondale SCA	All of park	Wild dogs, foxes, rabbits, feral cats.	Very significant for open woodland bird species - vulnerable Eastern False Pipistrelle, Barking Owl. Eastern Bent-wing Bat, Long-nosed Potoroo, Eastern Cave Bat.	Asset Protection	Baiting, trapping, ground shooting	C-TSC
Armidale	Booroolong NR	All of park	Blackberry, Nodding thistle, Xanthium spp.	Layered open forest – habitat for a number of threatened spp.	Asset Protection	Spot Spraying,	C-TSC
Armidale	Booroolong NR	All of park	Feral pigs, foxes, rabbits, feral cats.	Layered open forest – habitat for endangered Booroolong Frog, Bush Stone Curlew, Vulnerable Regent Honeyeater, Border Thick-tailed Gecko, Square-tailed Kite	Asset Protection	Trapping, aerial/ground shooting, baiting, fumigation	C-TSC
Armidale	Duval NR	All of park	Blackberry	Tall open forests/woodland. Threatened *Boronia granitica* predicted. Potential habitat for Border Thick-tailed Gecko, Turquoise Parrot. Significant densities of Greater Glider, Common Ringtail.	Asset Protection	Spot spraying	C-TSC
Armidale	Duval NR	All of park	Foxes, rabbits, feral cats.	Tall open forests/woodland. Threatened *Boronia granitica* predicted. Potential habitat for Border Thick-tailed Gecko, Turquoise Parrot. Significant densities of Greater Glider, Common Ringtail.	Asset Protection	Trapping, ground shooting, baiting, fumigation	C-TSC

Area	Reserve(s)	Site names	Target pests or weeds	Asset at risk	Aim of Control	Action	Priority
Armidale	Imbota NR	All of park	Blackberry, Serrated Tussock, Chilean needle grass	Open forest and woodland Endangered Regent Honeyeater, Vulnerable Koala, Barking Owl, Swift Parrot, Square-tailed Kite	Asset Protection	Spot spray Physical removal	C-TSC
Armidale	Imbota NR	All of park	Foxes , rabbits, feral cats,	Open forest and woodland Endangered Regent Honeyeater, Vulnerable Koala, Barking Owl, Swift Parrot, Square-tailed Kite	Asset Protection	Baiting, trapping, fumigation and warren destruction	C-TSC
Armidale	Indwarra NP	All of park	Blackberry	Dry open forests / woodlands. Barking Owl. Predicted habitat for Regent Honeyeater, Swift Parrot, Turquoise Parrot, Border Thick-tailed Gecko. .	Asset Protection	Spot spray,	L-LP
Armidale	Indwarra NP	All of park	Feral goats, feral pigs, foxes, feral cats,	Dry open forests / woodlands. Barking Owl. Predicted habitat for Regent Honeyeater, Swift Parrot, Turquoise Parrot, Border Thick-tailed Gecko..	Asset Protection	Aerial shooting, baiting,	C-TSC
Armidale	Mother of Ducks Lagoon NR	All of park	Blackberry, Nodding Thistle, Salix spp., St. John's Wort, Xanthium spp.	Aquatic vegetation providing habitat for various migratory avifauna, including Japanese (or Latham's) Snipe.	Asset Protection	Spot spray, chipping, stem injection / cut stump	C-TSC
Armidale	Mother of Ducks Lagoon NR	All of park	Feral cats, foxes, rabbits	Aquatic vegetation providing habitat for various migratory avifauna, including Japanese (or Latham's) Snipe.	Asset protection	Baiting, trapping, fumigation	C-TSC
Armidale	Mt. Yarrowyck NR	All of park	Blackberry, Coolatai Grass Prickly Pear spp.	Dry woodland, scrub and heath Habitat for Border Thick-tailed Gecko	Asset protection	Spot spraying, bio-control	M-CP
Armidale	Mt. Yarrowyck NR	All of park	Feral goats, feral pigs, foxes, rabbits, feral cats	Dry woodland, scrub and heath Habitat for Border Thick-tailed Gecko	Asset protection	Aerial and ground shooting, baiting, trapping, fumigation	H-CH

Area	Reserve(s)	Site names	Target pests or weeds	Asset at risk	Aim of Control	Action	Priority
Armidale	Single NP	All of park	Blackberry Coolatai Grass Prickly Pear spp. Xanthium spp.	Dry open forest, with large stands of ROTAP Eucalypt species - Narrow Leafed Black Peppermint (*Eucalyptus nicholli*). Glossy Black Cockatoo, macropods.	Asset protection	Spot Spraying, bio-control,	C-TSC
Armidale	Single NP	All of park	Feral pigs, feral goats, foxes, rabbits, feral cats	Dry open forest, with large stands of ROTAP Eucalypt species - Narrow Leafed Black Peppermint (*Eucalyptus nicholli*). Glossy Black Cockatoo, macropods.	Asset protection	Aerial and ground shooting, baiting, trapping, fumigation	C-TSC
Armidale	The Basin NR	All of park	Blackberry Prickly Pear spp. Salix spp.	Open woodland, woodland, heath. Common macropods. Potential habitat for Regent Honeyeater.	Asset protection	Spot Spraying, bio-control, stem injection/cut stump	C-TSC
Armidale	The Basin NR	All of park	Feral goats, feral pigs, foxes, rabbits, feral cats	Open woodland, woodland, heath. Common macropods. Potential habitat for Regent Honeyeater.	Asset protection	Aerial and ground shooting, baiting, trapping, fumigation	C-TSC
Armidale	Watsons Creek NP	All of park	Blackberry, Prickly Pear spp.	Dry sclerophyll woodland. Native orchids, Boronia and Cycads occur on the reserve.	Asset protection	Spot spraying, bio-control	M-CP
Armidale	Watsons Creek NP	All of park	Feral goats, feral pigs, foxes, rabbits, dogs, feral cats	Dry sclerophyll woodland. Native orchids, Boronia and Cycads occur on the reserve	Asset protection	Aerial and ground shooting, baiting, trapping, fumigation	C-TSC
Armidale	Watsons Creek NR	All of park	Blackberry, Prickly Pear spp.	Dry sclerophyll woodland. Native orchids, Boronia and Cycads occur on the reserve.	Asset protection	Spot spraying, bio-control	M-CP
Armidale	Watsons Creek NR	All of park	Feral goats, feral pigs, foxes, rabbits, wild, dogs, feral cats	Dry sclerophyll woodland. Native orchids, Boronia and Cycads occur on the reserve	Asset protection	Aerial and ground shooting, baiting, trapping, fumigation	C-TSC
Armidale	Yina NR	All of park	Blackberry, Prickly Pear spp., Serrated Tussock	Open forest / woodland,. 45 bird, 4 mammal species. Vulnerable Koala, Barking Owl.	Asset protection	Spot Spraying, bio-control, chipping.	C-TSC
Armidale	Yina NR	All of park	Rabbits, feral cats, foxes,	Open forest / woodland,. 45 bird, 4 mammal species. Vulnerable Koala, Barking Owl.	Asset protection	Baiting, trapping, fumigation	M-CP

Table of prioritised regional pest programs – Glen Innes Area

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of Control	Action	Priority
Glen Innes	Barayamal	Barayamal Trail	Blackberry, St Johns Wort, Tree of heaven, Coolatai grass, Privet, Osage orange	White box – Yellow box; Red gum – Yellow box	Asset protection	Overall foliar spray, cut stump, stem injection	C-TSC
Glen Innes	Barool	Nalarla Road, Mann River	Honey locust, Crofton weed, small leaf privet, Coolatai grass, African lovegrass, Giant Parramatta grass, whisky grass	Dry grassy open forest (high and low elevation)	Asset protection	Overall foliar spray, cut stump, stem injection, basal bark	C-TSC
Glen Innes	Barool	Nalarla Road, Bark Hut Road, Potters Road	Feral cat control	Susceptible native fauna - Spotted tailed quoll, Parma Wallaby, Long-nosed Potoroo	Asset protection	Leghold trapping, shooting	C-TSC
Glen Innes	Butterleaf	All of reserve	Feral pig control	*E. acaciiformis – Angophora floribunda* – EEC within Montane Peats and Swamps; *Baeckea omissa – Epacris microphylla* - EEC within Montane Peats and Swamps. Amphibian species in above EEC's	Asset protection	Pig trapping and 1080 baiting program	C-TSC
Glen Innes	Butterleaf	All of reserve	Wild dog /fox control	Predation on susceptible livestock Susceptible native fauna - , Swamp Wallaby, Red-necked Wallaby, Spotted tailed quoll	Asset protection	Aerial / ground baiting, trapping, shooting.	C-TSC
Glen Innes	Butterleaf	Scotts Trail, Butterleaf Road, Little Audrey Fire Trail, Diamond Trail	Feral cat control	Susceptible native fauna - Spotted tailed quoll	Asset protection	Leghold trapping, shooting	C-TSC
Glen Innes	Gibraltar Range	Middle Bend Fire Trail	Wild dog control	Predation on susceptible livestock	Asset protection	Aerial / ground baiting, trapping, shooting.	C-TSC

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of Control	Action	Priority
Glen Innes	Gibraltar Range	Gwydir Highway, Mulligans Drive	Whisky Grass, Lantana, Crofton Weed	Temperate rainforest (highway); E. olida, E. ligustrina, E. cameronii dry open forests and woodlands	Asset protection	Overall foliar spray/wick wiper, gas gun	C-TSC
Glen Innes	Gibraltar Range	Gwydir Highway, Mulligans Drive, Mulligans Hut camping area, Pitcocks Trail	Feral cat control	Susceptible native fauna - 141 bird species One quarter of which are at their geographic limits.	Asset protection	Leghold trapping, shooting	C-TSC
Glen Innes	Gibraltar Range	North West fire trail	Feral cattle control	E. planchonina, E. pyrocarpa - E. olida dry open forests and woodlands	Asset protection	Trapping (yards), judas cattle, ground shooting	C-TSC
Glen Innes	Goonoowigal	Whole reserve. Middle Creek main corridor.	Feral pig and feral goat control	Cypress pine – Orange Gum. Amphibian species on verges of Middle Creek	Asset protection	Feral pig trapping, judas goat - ground shoot/aerial shooting	C-TSC
Glen Innes	Goonoowigal	Middle Creek	Tree of Heaven, Coolatai Grass, Mother of Millions, St Johns Wort, Blackberry, Privet, Cats Claw Creeper	Cypress pine – Orange Gum	Asset protection	Overall foliar spray, cut stump	C-TSC
Glen Innes	Guy Fawkes River	Henry River Gorge, Stop a Bit Ck, London Bridge, Glen Nevis, Indigo, Williamson's bndary	Wild dog/fox control	Susceptible native fauna – Spotted tailed quolls, Swamp Wallabies, Red-necked Wallabies, Brush-tailed Rock Wallabies, Pademelons, and Potoroos in rainforest areas Predation on susceptible livestock	Asset protection	Aerial / ground baiting, trapping, shooting.	C-TSC C - EC
Glen Innes	Guy Fawkes River	London Bridge, Glen Nevis, Corner Camp Fire Trails, Boyd River	Giant Parramatta Grass, Coolatai Grass, Blackberry, Lantana	Dry open forest woodland – E. crebra	Asset protection	Overall foliar spray	C-TSC M-WNH
Glen Innes	Kings Plains	Kings Plains Creek – goats; Eastern boundary, 3 Waterholes Creek, Wean Creek – feral pigs	Pig and goat control	Apple – River Oak riparian woodlands – predation on amphibian species (pigs); Ironbark – Cypress woodlands	Asset protection	Pig trapping, 1080 baiting, aerial shooting program	C-TSC
Glen Innes	Kings Plains	Whole reserve.	Deer control (Fallow deer)	Ironbark – Cypress woodlands	Asset protection	Trapping, aerial shooting program	C-TSC

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of Control	Action	Priority
Glen Innes	Kings Plains	Three Waterholes, Blackbutt and Branch Fire Trails	Wild dog/fox control	Susceptible native fauna - Red Necked Wallaby, Brush Tailed Rock Wallaby, Platypus. Crimson Rosella's, Yellow Tailed Black Cockatoo, Honeyeater species. Predation on susceptible livestock	Asset protection	Aerial / ground baiting, trapping, shooting.	C-TSC C - EC
Glen Innes	Kings Plains	All of park	African Lovegrass, Coolatai Grass, Blackberry, Whisky Grass, Privet	Ironbark – Cypress woodlands; Apple – River Oak riparian woodlands;	Asset protection	Overall foliar spray, cut stump	C-TSC
Glen Innes	Little Llangothlin	All of reserve	Fox control	RAMSAR - 100 bird species, 40 of which are water-birds including vulnerable spp. such as the Comb-crested jacana and the blue-billed duck. No small mammals; Predation on susceptible livestock	Asset protection	Buried baiting, M 44's, leghold trapping, spotlight shooting	C-TSC C - EC
Glen Innes	Little Llangothlin	All of reserve	Rabbit control	Dry grass swamp – *Glyceria australis*; and grass meadows - *Holcus lanatus* and *Carex gaudichaudiana*	Asset protection	Spotlight shooting, 1080 baiting	C-TSC
Glen Innes	Little Llangothlin	All of reserve	Blackberry, Nodding Thistle, Hemlock	Dry grass swamp – *Glyceria australis*; and grass meadows - *Holcus lanatus* and *Carex gaudichaudiana.* Remnant snow gum communities dominated by *E. pauciflora and E. stellulata.*	Asset protection	Overall foliar spray	C-TSC
Glen Innes	Mann River	Mann River – south of camping area	Pig control	Red gum – Bloodwood – Ironbark woodlands. Amphibian species in riparian environment	Asset protection	Pig trapping	C-TSC
Glen Innes	Mann River	Mann River, Bald Nob Creek	Wild dog control	Predation on susceptible livestock	Asset protection	Aerial / ground baiting, trapping, shooting.	C - EC
Glen Innes	Mann River	Northern and eastern boundary adjacent to Old Grafton Road	Coolatai Grass, African Lovegrass, Giant Parramatta Grass	Broad-leafed Stringybark – Grey Gum woodland; Red gum – Bloodwood – Ironbark woodlands	Asset protection	Overall foliar spray	C-TSC

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of Control	Action	Priority
Glen Innes	Nullamanna	Whole reserve	Wild dog control	Predation on susceptible livestock	Asset protection	Aerial / ground baiting, trapping, shooting.	C-EC
Glen Innes	Nullamanna	Whole reserve	Feral pig control and feral goat control	Tumbledown gum – Black PIne	Asset protection	Aerial shooting program	C-TSC
Glen Innes	Nymboida	Cunglebung, Kaloe, Cunglebung Ck Trails; Cunglebung, Wellington,Mosquito Cks; –Mann River	Blackberry, Mysore, Lantana, Whisky Grass, Coolatai grass, Giant Parramatta Grass, Honey Locust	Riparian complex communities	Asset protection	Foliar spray, cut stump, basal bark	C-TSC M-WNH
Glen Innes	Nymboida	Mann River, Cunglebung, Mosquito, Wellington Cks	Feral cattle control	Riparian complex communities	Asset protection	Trapping (yards), Judas cattle, ground shooting	C-TSC M-WNH
Glen Innes	Tingha Plateau	Whole reserve – Middle Creek	Feral pig and feral goat control	White box – Yellow box; Red gum – Yellow box, Cypress pine – Orange Gum	Asset protection	Ground shooting and aerial shooting. 1080 baiting for feral pigs.	C-TSC
Glen Innes	Tingha Plateau	Ponds Road, access trails	Feral cat control	Susceptible native fauna - Brown Treecreeper, Diamond Firetail, Speckled Warbler, Border Thick-tailed Gecko, Greater Long-eared Bat Glossy Black Cockatoo, Squirrel Glider, Regent Honeyeaters and Black-throated Finches	Asset protection	Leghold trapping, shooting	C-TSC
Glen Innes	Tingha Plateau	Main access trails	Coolatai Grass, Whisky grass	White box – Yellow box; Cypress pine – Orange Gum	Asset protection	Foliar spray	C-TSC
Glen Innes	Warra	Horseshoe bend Trail, Moggs Swamp Trail	Wild dog /fox control	Susceptible native fauna - Spotted Tailed Tiger Quoll, Red-Necked Wallaby, Dark Brown Swamp Wallaby, Yellow-Tailed Black Cockatoos, Glossy Black Cockatoos, Masked Owl Predation on susceptible livestock	Asset protection	Aerial / ground baiting, trapping, shooting.	C-TSC C-EC
Glen Innes	Warra	Horseshoe bend Trail, Moggs Swamp Trail	Feral pig control	Stringybark, grassy open forests, Manna Gum – Messmate Open Forests	Asset protection	1080 baiting, trapping for feral pigs.	C-TSC

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of Control	Action	Priority
Glen Innes	Washpool	North Washpool – adjacent to Redbank/Ewingar Fire Trails	Wild dog control	Dry escarpment open forest	Asset protection	Aerial / ground baiting, trapping, shooting.	C-EC
Glen Innes	Washpool	Coachwood Drive, Moogem Trail	Feral cat control	Susceptible native fauna - Spotted tailed quoll	Asset protection	Leghold trapping	C-TSC H-IH
Glen Innes	Washpool	Bicentennial Trail, Moogem Trail	Feral cattle control	Dry escarpment open forest/sclerophyll	Asset protection	Trapping (yards), Judas cattle, ground shooting	C-TSC H-IH
Glen Innes	Washpool	Washpool Creek, Moogem Fire Trail, Gwydir Highway	Lantana, Giant Parramatta Grass, Crofton Weed, Whisky Grass, Coolatai grass	Dry escarpment open forest/sclerophyll	Asset protection	Foliar spray	C-TSC H-IH
Glen Innes	Washpool NP Gibraltar Range NP	Coombadja Creek Desert Creek Washpool CreekDandarah Creek	Amphibian chytrid fungus	Mixophyes balbus Mixophyes iteratus Litoria subglandulosa	Containment – Externally funded until June 2013	Monitor	C-NE

Table of prioritised regional pest programs – Tenterfield Area

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of Control	Action	Priority
Tenterfield	Bald Rock	Carolls Creek, Fairy Valley, Airstrip trail, 2 Mile Trail, Leahey's Trail	Pig control	Moist tall open forests, grassy tall open forests	Asset protection	Trapping, baiting, shooting	C-TSC
Tenterfield	Bald Rock	Airstrip trail	Wild dog control	Livestock on adjoining properties	Asset protection	Aerial / ground baiting, trapping, shooting.	C- EC
Tenterfield	Bald Rock	Carolls Creek, Airstrip Trail, Bookookoorara Trail, Resurrection Trail. North Boundary Trail	Blackberry; Coolatai, whisky grass, lovegrass & fire weed	Moist tall open forests, grassy tall open forests	Asset protection	Overall foliar spray, physical/mechanical control, monitoring	C-TSC
Tenterfield	Boonoo Boonoo	Martins Flat, Mackay Trail	Pig control	Shrubby open forests, moist tall open forests, grassy tall open forests	Asset protection	Pig trapping and 1080 baiting program	C-TSC
Tenterfield	Boonoo Boonoo	Colongin Road, SE Boundary Trail	Wild dog control	Livestock on adjoining properties	Asset protection	Aerial / ground baiting, trapping, shooting.	C-TSC
Tenterfield	Boonoo Boonoo	Martins Flat, Colongin Road	Blackberry, Coolatai, whisky grass, lovegrass, Giant Parramatta grass	Shrubby open forests	Asset protection	Overall foliar spray/wick wiper, physical/mechanical control, monitoring	C-TSC
Tenterfield	Arakoola	Caves Trail, Spring Creek Trail, Ottleys Creek trail	Wild dog/ fox control	Wild dogs - Livestock on adjoining properties; Foxes – susceptible native species	Asset protection	Ground baiting, trapping, shooting.	C-EC C-TSC
Tenterfield	Arakoola	Ottley Creek, Trig point, Spring Creek	Feral pig and feral goat control	Rough barked apple-bottlebrush creeklines, white box basalt woodland	Asset protection	Ground shooting and aerial shooting	C-TSC
Tenterfield	Arakoola	Ottley Creek, Spring Creek	Willows, Peach, Tree of Heaven	Rough barked apple-bottlebrush creeklines	Asset protection	Overall foliar spray, cut stump, stem injection	C-TSC
Tenterfield	Basket Swamp	Basket Swamp Rd/Trail, Wellington Creek trail, Wellington Rock Trail	Wild dog control	Livestock on adjoining properties	Asset protection	Ground baiting, trapping, shooting.	C - EC

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of Control	Action	Priority
Tenterfield	Basket Swamp	Woollool Woolloolni Road (east of Timbarra trig)	Feral pigs	Blackbutt-stringy bark grassy open forests, blackbutt-stringy bark ROTAP spp (Vulnerable) *Solanum nobile; Homoranthus lunatus; Callistris oblonga* spp. *parva*	Asset protection	Trapping, baiting, shooting	C-TSC
Tenterfield	Basket Swamp	Basket Swamp Rd, Basket Swamp trail, Woollool Woolloolni Road	Giant Parramatta grass	Blackbutt-stringy bark grassy open forests, blackbutt-stringy bark shrubby open forests	Asset protection	Overall foliar spray/wick wiper	C-TSC
Tenterfield	Bluff River	Dry Creek, Bluff River	Wild dog/fox control	Livestock on adjoining properties; susceptible native species – Spotted tailed quoll	Asset protection	Aerial / ground baiting, trapping, shooting.	C–EC C-TSC
Tenterfield	Bluff River	Whole reserve	Feral pig and feral goat control	Box-redgum grassy woodlands, Orange gum-Caley's Ironbark woodlands, Woolybutt-yellow box grassy woodlands. 7 ROTAP's (1 endangered - *Callistemon flavovirens*); 6 Vulnerable including *Prostanthera spp, Dodonaea* spp*, Olearia* spp*, Plectranthus* spp*, Acacia* spp*, Eucalyptus* spp.	Asset protection	Aerial / ground shooting, baiting, trapping	C-TSC
Tenterfield	Bolivia	Brazil Trail, Chile Trail. Aerial baiting on southern boundary.	Wild dog/fox control	Livestock on adjoining properties; susceptible native species	Asset protection	Aerial / ground baiting, trapping, shooting.	C–EC C-TSC
Tenterfield	Bolivia	Whole reserve	Feral pig and feral goat control	19 ROTAP's. 4 endangered - *Boronia boliviensis; Desmodium campylocaulon; Homoranthus croftianus; Pimelia venosa.*	Asset protection	Aerial / ground shooting, baiting, trapping	C-TSC
Tenterfield	Bolivia	Patagonia Trail, Chile Trail	Blackberry, Coolatai, whisky grass.	Stringy bark – Blackbutt grassy open forests, box - redgum grassy woodlands	Asset protection	Overall foliar spray/wick wiper	C-TSC
Tenterfield	Capoompeta	Highland Home, Highland Home, Finegans Gap fire trails	Pig control	Blackbutt-Mountain Gum grassy forests. 2 significant species at risk from feral pig damage : *Bothriochloa biloba; Dodonnaea serratifolia*	Asset protection	Trapping, baiting, shooting	C-TSC

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of Control	Action	Priority
Tenterfield	Capoompeta	Highland Home, Highland Home, Finegans Gap fire trails	Wild dog/fox control	Livestock on adjoining properties; susceptible native species - Spotted tailed quoll	Asset protection	Aerial / ground baiting, trapping, shooting.	C–EC C-TSC
Tenterfield	Cataract	Vicinity of Morgans Trail	Wild dog	Livestock on adjoining properties; Native fauna protection - Brush Tailed Rock wallabies, Spotted tailed quoll	Asset protection	Aerial / ground baiting, trapping, shooting.	C–EC C-TSC
Tenterfield	Cataract	Lantana – all fire trails CCC – Tooloom Creek	Lantana, cats claw creeper	Brush box- turpentine community	Asset protection	Overall foliar spray	C-TSC
Tenterfield	Curry's Gap	Curry's Trail	Fox control	Susceptible native fauna - Border Thick – tailed Gecko, Squirrel Glider and Glossy Black Cockatoo Predation on susceptible livestock	Asset protection	Trapping, ground baiting	C-TSC C - EC
Tenterfield	Curry's Gap	Curry's Trail	Pig control	Apple-Cabbage gum woodlands, New England Peppermint – Yellow Box Woodlands	Asset protection	Pig trapping and 1080 baiting program	C-TSC
Tenterfield	Curry's Gap	Curry's Trail, local watercourses	Blackberry, tiger pear, lovegrass, privet.	Apple-Cabbage gum woodlands, New England Peppermint – Yellow Box Woodlands	Asset protection	Foliar spray, cut stump	C-TSC
Tenterfield	Dthinna Dthinnawan	Nicholls Road – feral goats Middle Creek, Inverary – feral pigs	Feral pig and feral goat control	White cypress – silver leafed, smooth barked apple – black cypress Grassy chenopod, red gum, bulloak-white cypress	Asset protection	Ground shooting and aerial shooting. 1080 baiting for feral pigs. Trapping for goats (water/feed traps)	C-TSC
Tenterfield	Dthinna Dthinnawan	Middle Creek, Inverary	Feral cattle	Grassy chenopod, red gum, bulloak-white cypress	Asset protection	Trapping, ground shooting (Judas collar).	C-TSC
Tenterfield	Dthinna Dthinnawan	Boundary Road, Nichols Rd, Holdfast Rd, Dight Rd, Ropes Rd	Wild dog /fox control	Susceptible native fauna - Turquoise Parrot, Brown Treecreeper (eastern ssp.), Speckled Warbler, Koala, Diamond Firetail Predation on susceptible livestock	Asset protection	Aerial / ground baiting, trapping, shooting.	C-TSC C-EC
Tenterfield	Dthinna Dthinnawan	Inverary house	Rabbit control	Houses and infrastructure	Asset protection	Fumigation, ground shooting, 1080 baiting	H-CH

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of Control	Action	Priority
Tenterfield	Dthinna Dthinnawan	Middle Creek, Browns Creek Old homestead (CCC)	Mother of millions, cats claw creeper	Red gum	Asset protection	Foliar spray, biological control – Citrus Thrip (Cats Claw Creeper)	C-TSC
Tenterfield	Kwiambal	Feral goats – whole reserve Feral pigs – Severn/Macintyre River,	Feral pig and feral goat control	White pine – tumbledown gum, white pine – silver ironbark – box Red Gum - Apple – River Red Gum	Asset protection	Ground shooting and aerial shooting. 1080 baiting/trapping for feral pigs. Trapping for goats (water/feed traps)	C-TSC
Tenterfield	Kwiambal	Main access roads – Lemon Tree Flat, Macintyre Falls, Limestone Rd	Wild dog/fox control	Susceptible native fauna - 7 vulnerable species including Brown, Treecreeper, Speckled Warbler, Squirrel Glider, Yellow-Bellied Sheath-Tailed Bat, Greater Long-Eared Bat, Little Pied Bat Predation on susceptible livestock	Asset protection	Aerial / ground baiting, trapping, shooting.	C-TSC C-EC
Tenterfield	Kwiambal	Kwiambal house/workshop	Rabbit control –	Houses and infrastructure	Asset protection	Fumigation, ground shooting, 1080 baiting	H - CH
Tenterfield	Kwiambal	Severn/Macintyre River. Mother of Millions on Lemon Tree Flat Rd and behind houses	Honey locust, Osage Orange, Tree of Heaven, golden dodder, mother of millions, Noogoora burr	Red Gum - Apple – River Red Gum White pine – Tumbledown gum - Apple	Asset protection	Foliar spray, cut stump, stem injection	C-TSC
Tenterfield	Mt Mackenzie	Adjacent to Mt Mackenzie Lookout Rd	Pig control	Messmate - Manna Gum Tall Open Forests. 1 ROTAP (endangered – *Prostanthera digitiformis).*	Asset protection	Trapping, baiting, shooting	C-TSC
Tenterfield	Severn River	Severn River	Feral pig and feral goat control	Rough barked Apple River Banks Aboriginal art sites	Asset protection	Aerial/ground shooting, trapping. Fencing exclusion for feral goats on aboriginal art sites	C-TSC H-CH
Tenterfield	Severn River	Severn River, Flaggy Creek (aerial bait); Rocky Road Trail, Trixies Trail, Scrub Hut Trail, Wooder Trail (buried baits/M 44's)	Wild dog/fox control	Susceptible native fauna – 46 bird species, plus Koalas, Platypus, Red Necked Wallaby, Eastern Grey Kangaroos. Predation on susceptible livestock	Asset protection	Aerial / ground Baiting, trapping, shooting.	C-TSC

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of Control	Action	Priority
Tenterfield	Severn River	Severn River Rocky Road Trail (Coolatai Grass)	Honey locust, osage orange, tree of heaven, noogoora burr, Coolatai grass	Rough barked Apple River Banks Tea- tree Shrublands and Grasslands	Asset protection	Foliar spray, cut stump, stem injection	C-TSC
Tenterfield	Taringa	Whole reserve	Feral pig and feral goat control	Silver leaf Ironbark – White Box Woodland	Asset protection	Aerial/ground shooting, baiting, trapping	C-TSC
Tenterfield	Timbarra	McCleods Trail, eastern boundary	Lantana	Brush box- turpentine	Asset protection	Overall foliar spray	C-TSC
Tenterfield	Torrington	Duck Creek, Carpet Snake Creek, Butlers Fire Trail	Feral pig and feral goat control	Shrubby forests and woodlands on granite/ Rocky outcrops on the Mole granite	Asset protection	Aerial/ground shooting, baiting, trapping	C-TSC
Tenterfield	Torrington	Duck Creek, Carpet Snake Creek, Butlers Fire Trail, Blatherarm, Bates – Sugarloaf Trails	Wild dog/fox/cat control	Susceptible native fauna - 31 mammal species. Include Tiger Quoll, Eastern Grey Kangaroo, Swamp Wallaby. 135 bird species Predation on susceptible livestock	Asset protection	Aerial / ground baiting, trapping, shooting.	C-TSC C-EC
Tenterfield	Washpool (west)	Spirabo Forest Way, Farnell Road, Billyrimba Road	Wild dog/fox control	Susceptible native fauna - 141 bird spp. recorded. Spotted Tailed Tiger Quoll, Parma Wallaby, Rufous Bettong, Long Nosed Potoroo. Predation on susceptible livestock	Asset protection	Aerial / ground baiting, trapping, shooting.	C-TSC C-EC
Tenterfield	Washpool (west)	4 Bulls, Wattle Creek Road	Feral cattle	Blackbutt – Messmate forests, Blackbutt – Die - hard Stringybark Forest. 2 significant species at risk from feral pig damage : *Bothriochloa biloba; Dodonaea serratifolia*	Asset protection	Trapping, ground shooting (Judas collar).	C-TSC
Tenterfield	Washpool (west)	4 Bulls, 5 Bulls	Pig control	Blackbutt – Messmate forests, Blackbutt – Die - hard Stringybark Forest. 2 significant species at risk from feral pig damage : *Bothriochloa biloba; Dodonaea serratifolia*	Asset protection	Trapping, baiting, shooting	C-TSC
Tenterfield	Washpool (west)	4 Bulls, 5 Bulls, Farnell Road, Wattle Creek Road	Blackberry, giant Parramatta grass	Blackbutt – Messmate forests, Blackbutt – Die - hard Stringybark Forest	Asset protection	Overall foliar spray/wick wiper	C-TSC

Table of prioritised regional pest programs – Walcha Area

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of Control	Action	Priority
Walcha	Aberbaldie NR	All of park	Foxes	Native fauna	Asset protection	Ground baiting	M-CP
Walcha	Aberbaldie NR	All of park	Blackberry	Native flora	Asset protection	Spot spraying	L-LP
Walcha	Aberbaldie NR	All of park	Feral pigs	Native flora and fauna, neighbouring landholders	Asset protection	Ground shooting and trapping	M-CP
Walcha	Carrai Waterholes AA	All of park	Blackberry	Indigenous cultural heritage values, threatened flora species and EEC	Asset protection	Spot spraying	H-CH
Walcha	Carrai National Park and SCA	Carrai	Blackberry	Warm temperate rainforest, Hastings River Mouse, and >10 other threatened fauna species.	Asset protection	Spot spraying	C-TSC
Walcha	Cottan-bimbang NP and SCA	All of park	Blackberry and Crofton Weed	Native flora	Containment	Spot spraying	M-RA
Walcha	Cottan-bimbang NP and SCA	Oxley Hwy	Coolatai Grass	Native flora	Eradication	Spot spraying	C-NE
Walcha	Cottan-bimbang NP and SCA	All of park	Wild Dogs, foxes	Native fauna including TSC listed species Neighbour relations (stock loss)	Asset protection	Aerial / ground baiting, trapping, shooting.	C-EC
Walcha	Melville Range NR	All of park	Foxes	Native fauna	Asset protection	Ground baiting	M-CP
Walcha	Melville Range NR	All of park	Goats	Native flora and fauna	Asset protection	Ground shooting, trapping, mustering	M-CP
Walcha	Melville Range NR	All of park	Coolatai Grass, St Johns Wort	Native flora and fauna	Asset protection	Foliar spraying	C-NE
Walcha	Mummel Gulf NP	Dicks Hut area	Blackberry	Wilderness values	Containment	Spot spraying	M-WNH
Walcha	Mummel Gulf NP	Oxley Hwy	Coolatai Grass	Native flora and fauna	Eradication	Spot spraying	C-NE
Walcha	Mummel Gulf NP	Eastern Boundary Trail	Agapanthus	Native flora, Park values, neighbour relations	Eradication	Removal	L-LP
Walcha	Mummel Gulf NP and SCA	Boundary areas	Blackberry	Park values, neighbour relations	Asset protection	Spot spraying	M-CP

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of Control	Action	Priority
Walcha	Mummel Gulf NP and SCA	All of reserves	Pigs	Native flora, Park values, neighbour relations	Asset protection	Poisoning, trapping.	M-CP
Walcha	Mummel Gulf NP and SCA	Road & trail sides	Crofton Weed	Native flora	Containment	Spot spraying	M-RA
Walcha	Mummel Gulf NP and SCA	All of park	Wild dogs, foxes	Native fauna including TSC listed species Neighbour relations (stock loss)	Containment	Aerial / ground baiting, trapping, shooting.	C-EC
Walcha	Nowendoc NP	Christies and Jacky Barker	St Johns Wort	Parts of Nowendoc NP declared wilderness >10 threatened flora and fauna species	Asset protection	Spot spraying	C-NE
Walcha	Nowendoc NP /Ngulin/Tuggolo Ck NR	All of reserves	Wild Dogs, foxes	Brush-tailed Rock-wallabies, Koala, other native fauna including TSC listed species. Neighbour relations (stock loss)	Asset protection	Aerial / ground baiting, trapping, shooting.	C-EC
Walcha	Nowendoc NP /Ngulin/Tuggolo Ck NR	All of reserves	Goats	Threatened Native flora and fauna species including Brush-tailed Rock-wallabies, wilderness values	Asset protection	Aerial/ground shooting, baiting, trapping	C-TSC
Walcha	Nowendoc NP /Ngulin/Tuggolo Ck NR	All of reserves	Pigs	Native flora and fauna species, wilderness values, Montane peatlands and and Swamps EEC.	Asset protection	Aerial/ground shooting, baiting, trapping	C-TSC
Walcha	Nowendoc NP /Ngulin/Tuggolo Ck NR	All of reserves	Blackberry	Native flora and fauna species, wilderness values, Montane peatlands and and Swamps EEC.	Asset protection	Spot spraying	C-TSC
Walcha	Nowendoc NP	Tuggolo Ck	Horses	Native flora and fauna species, wilderness values, impacts on waterways	Asset protection	Develop plan to remove horses	M-WNH
Walcha	Nowendoc NP /Ngulin/Tuggolo Ck NR	All of reserves	Nodding Thistle	Neighbouring properties	Asset protection	Spot spraying	C-EC
Walcha	Oxley Wild Rivers NP	Kunderang Brook	Coolatai grass	Declared wilderness	Eradication	Burning and foliar spraying	C-NE
Walcha	Oxley Wild Rivers NP	Green Gully	Wild Dogs, foxes	Brush-tailed Rock-wallabies	Asset protection	Aerial / ground baiting, trapping, shooting.	C-TSC

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of Control	Action	Priority
Walcha	Oxley Wild Rivers NP	Upper Rowleys Ck, Stony Ck to Apsley Falls, Upper Rusdens	Goats	Threatened plant species/communities associated with the Gorge Rim, Brush-tailed Rock-wallabies	Asset protection	Monitoring, Aerial/ground shooting, baiting, trapping	C-TSC
Walcha	Oxley Wild Rivers NP	All of park	Wild Dogs, foxes	Brush-tailed Rock-wallabies, Koala, other native fauna including TSC listed species. Neighbour relations (stock loss)	Asset protection	Aerial / ground baiting, trapping, shooting.	C-EC
Walcha	Oxley Wild Rivers NP	All of park	Feral Pigs	World Heritage and wilderness values, numerous threatened flora and fauna species	Asset protection	Aerial/ground shooting, baiting, trapping	C-TSC
Walcha	Oxley Wild Rivers NP	Kunderang Brook	Blackberry and Lantana	World Heritage listed Dry Rainforest, threatened flora species	Asset protection	Spot spraying	C-TSC
Walcha	Oxley Wild Rivers NP	Apsley and Yarrowitch Rivers and tributaries	Blackberry, lantana and pasture weeds	World Heritage listed Dry Rainforest, threatened flora species eg Haloragis exalata subspecies velutina	Asset protection	Spot spraying	C-TSC
Walcha	Oxley Wild Rivers NP	Apsley and Yarrowitch Rivers and tributaries	Feral pigs	World Heritage listed Dry Rainforest,threatened flora species eg Haloragis exalata subspecies velutina	Asset protection	Aerial/ground shooting, baiting, trapping	C-TSC
Walcha	Oxley Wild Rivers NP	Apsley and Yarrowitch Rivers and tributaries	Feral horses	World Heritage Listed dry rainforest, wilderness values, threatened flora species eg Haloragis exalata subspecies velutina	Asset protection	Trapping and removal	C-TSC
Walcha	Werrikimbe NP	Racecourse and Bishops Swamps	Blackberry	Montane peatlands and Swamps EEC, threatened flora species incl Euphrasia ciliolata	Asset protection	Spot spraying	C-TSC
Walcha	Werrikimbe NP	Mooraback	Blackberry	Montane peatlands and Swamps EEC, threatened flora species incl Austral toadflax	Asset protection	Spot spraying	C-TSC
Walcha	Werrikimbe NP	Lower Mooraback	Blackberry	World Heritage listed rainforest, >10 threatened species, gazetted wild rivers, wilderness values	Asset protection	Spot spraying	C-TSC

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of Control	Action	Priority
Walcha	Werrikimbe NP	Racecourse and Bishops Swamps	Feral pigs	Montane peatlands and Swamps EEC, threatened flora species incl Euphrasia ciliolata	Asset protection	Aerial/ground shooting, baiting, trapping	C-TSC
Walcha	Werrikimbe NP	Racecourse Trail, Werrikimbe Trail	Phytophthora (*Phytophthora cinnamomi*)	Montane peatlands and Swamps EEC, threatened flora species incl Euphrasia ciliolata	Containment	Use restrictions in wet weather	L-LP
Walcha	Werrikimbe NP	All of park	Wild Dogs, foxes	Native fauna including TSC listed species. Neighbour relations (stock loss)	Asset protection	Aerial / ground baiting, trapping, shooting.	C-EC

6. Consultation

The Northern Tablelands Region Pest Management Strategy was developed through an open consultation process involving identified stakeholders, community representatives and regional staff. A Regional Pest Management Strategy Stakeholder Forum was conducted in Armidale on the 1st September 2011.

The participants included local representatives of Catchment Management Authorities; Livestock Health and Pest Authorities; Weeds Authorities; Local Government; Game Council; Regional Advisory Committee; Wild Dog Control Associations; National Parks Association; NSW Farmers; and Department of Primary Industries.

Key issues raised from this forum were:

- the need for a landscape approach to all pest management with increased cooperation and coordination of all pest control programs (refer to Goal 2 Objective 2.2 in part A);
- the need for a high priority to be given to preventing the establishment of new pest species on NPWS lands within the region, e.g. Tropical Soda Apple (*Solanum viarum* Dunal) (refer to Goal 1 Objective 1.1 in Part A);
- the need for more coordinated control of wild dogs, across all tenures and regional boundaries, to counter increasing livestock predation, (refer to Goal 2 Objective 2.2 in part A);
- the need to increase the level of control across the region for all pest species, particularly wild dogs, feral goats, feral pigs and deer (refer to Goal 2 Objective 2.2 in part A);
- the need to utilise all available legal and humane control methods to achieve integrated management of pest species. Investigate and include, where appropriate, new or alternative techniques such as the M44 used for wild dog and fox control (refer to Goal 2 Objective 2.2 in part A);
- to consider the establishment of exclusion and containment zones within reserves with permanent bait stations to act as a buffer to the movement of pest into and out of the reserve (refer to Goal 2 Objective 2.2 in part A);
- the need to map pest species, monitor the effectiveness of control programs and identify movement pathways and potential threats (refer to Goal 3 Objective 3.4 in part A);
- the need for improved communication and public education to raise awareness of pest management issues and their responsibilities under the relevant legislation (refer to Goal 3 Objective 3.2 in Part A);

A number of important issues were raised that are beyond the scope of a regional pest management strategy. These issues have been directed to the NSW State Pest Forum and/or to the relevant control authority.

In addition to the Regional Pest Forum, staff maintain ongoing liaison with other government agencies, weed control authorities, wild dog control associations, neighbours and other key stakeholders

Workshops, to accurately identify and prioritise pest management programs, were conducted with key staff from each operational Area. Following the preparation of the draft Pest Management Strategy, the document will be placed on public exhibition and comments will be invited from the community, other government agencies and stakeholder groups.

7. Pest species overviews

Information about high profile pests for this region is summarised below. More details regarding the distribution, impacts and management options for these and other pest species can be found in other reference documents including the following web pages:

http://www.dpi.nsw.gov.au/agriculture/pests-weeds/vertebrate-pests/general-information/pest-animal-survey

http://environment.gov.au/biodiversity/invasive/publications/humane-control.html

http://www.invasiveanimals.com/

http://www.environment.gov.au/biodiversity/invasive/ferals/index.html

http://www.environment.nsw.gov.au/threatenedspecies/KeyThreateningProcessesByDoctype.htm

http://www.dpi.nsw.gov.au/agriculture/pests-weeds/weeds/profiles

http://www.weeds.org.au/WoNS/

http://www.rirdc.gov.au/programs/national-rural-issues/weeds/weeds_home.cfm

http://www.weeds.gov.au/

Pest Animal Species Programs

DEER (Fallow – *Dama dama;* Red - *Cervus elaphus;* Rusa - *Cervus timorensis).*

Distribution and abundance

Deer, at low to medium densities, are widespread across north-eastern New South Wales. Their presence has been confirmed in numerous reserves in the Northern Tablelands Region (refer to Pest Distribution Tables). Off park the management of deer is the responsibility of the NSW Game Council, as deer are recognised as a game species, under the *Game and Feral Animal Control Act 2002*.

The distribution and density of deer in the Northern Tablelands is increasing rapidly and the management of deer is a significant issue for NPWS in this Region.

Impacts

Deer graze on native flora and compete with native fauna for food and shelter. Where there is overlap between deer distribution and the presence of ROTAP's, impacts could be severe. The impact of deer has not yet been fully assessed in the Region but as the density and distribution increase the impact is expected to be significant.

There are also increasing reports of motor vehicle accidents, caused by deer crossing roads between dusk and dawn.

Priorities for Control

Control will be implemented in areas where deer are causing a measurable impact on flora or fauna species or are impacting on neighboring agricultural enterprises. A priority will also be given to control of deer in new areas where they have not yet become established.

Control

- Conduct cooperative control programs with adjoining landholders such as aerial shooting, spotlight shooting and trapping.
- Use of the 'Judas' technique to increase knowledge on deer habits and movement patterns such as home range and average group size.
- All deer control will be carried out in accord with the appropriate Code of Practice and Standard Operating Procedures.

Monitoring

Monitoring will include surveys to measure changes in the distribution, density and species of deer on reserves in the Northern Tablelands Region (NTR). Survey methods may include sand plot monitoring, remote cameras, dung counts and liaison with neighbouring landholders. Reports of sightings by NPWS staff, neighbours and the general public will be recorded and entered into the pest database.

FERAL CAT (*Felis catus*)

Distribution and Abundance

Feral cats are found at low to medium densities throughout the tablelands and occur in nearly all reserves within the NTR.

Impacts

A range of native species, including birds, small mammals, reptiles and rodents are subject to predation by feral cats. However there is no clear evidence that predation is having a significant impact on any native species population within the NTR. Feral cats also compete with native predators such as the Spotted-tailed Quoll for food.

Endangered or threatened species within the Region at risk from feral cat predation include: the Regent Honeyeater, the Hastings River Mouse and the Border Thick-tailed Gecko.

Priorities for Control

Feral cat control is generally a low to medium priority for the Region. Planned feral cat control programs will only be initiated where there is an established need to protect endangered or threatened species or for other identified management purposes. At this point a cat control program has only been identified for Gibraltar Range NP and Washpool (West) NP. Opportunistic control may be undertaken in conjunction with pest management or field activities.

Control

All feral cat control will be carried out in accordance with the appropriate Code of Practice and Standard Operating Procedures. Control methods for feral cats may include cage trapping, padded-jaw trapping and shooting. Other new methods of control will be assessed and implemented if found to be effective.

Monitoring

Currently there are no cost-effective methods for monitoring the abundance of feral cats or their impact on native wildlife. Monitoring will be limited to the opportunistic collection of data by staff during field operations or from remote cameras used in research programs. All data whether feral cat sightings or control will be entered into the regional pest database.

FERAL GOAT (*Capra hircus*)

Distribution and Abundance

Feral goats occur across a wide range of habitats in all states of Australia. Within NTR, feral goat populations are largely restricted to native vegetation remnants in hilly to mountainous areas of both public and private lands.

They are present in more than 30 reserves within the Region, with the highest densities being on the western slopes of the tablelands. The density and distribution of goat populations varies between reserves. The Pest Animal Distribution Tables provide an indication of the distribution of feral goats within the Region.

Impacts

Grazing and browsing by feral goats has significant impacts on native vegetation. It can lead to changes in species composition and vegetation structure. Areas with a high density of goats have a conspicuous browse line, as all foliage within their reach is consumed.

Feral goats can survive on highly fibrous, low nutrient herbage, provided sufficient water is available and will consume litter, fruit fall, bark and sticks. This can lead to a decrease in overall cover and an increase in bare ground. This, combined with trampling and soil surface damage caused by their hooves, may result in significant increases in soil erosion. These habitat changes in turn affect native fauna, which may also be impacted by feral goats through competition for food, water and shelter.

Competition and habitat degradation by feral goats has been listed as a key threatening process under the NSW TSC Act. In the NTR, there are 28 species listed as endangered or vulnerable under the TSC Act which are impacted upon by feral goats. These include; mammals, reptiles and plants, as well as four endangered ecological communities. Feral goats also cause damage to Aboriginal heritage sites, compete with neighbouring livestock and are potential vectors of livestock diseases.

Harvesting of feral goats has become an important income source for some landholders, and this view of goats as a potential resource needs to be taken into consideration when conducting control programs.

Priorities for Control

High priority sites for feral goat control in the NTR are Oxley Wild Rivers NP, Warrabah NP, Ironbark NR, Mount Yarrowyck NR, Gwydir River NP, Torrington SCA, Bolivia Hill NR, Kwiambal NP, Bluff River NR and the Severn River NR. These reserves have a high density of goats and/or a high number of goat vulnerable threatened entities (GVTE's).

Dthinna Dthinnawan CCA, Taringa NR, Arakoola NR, Kings Plains NP, The Basin NR, and Nullamanna CCA are medium priority sites, having a high density of goats but a lower number of GVTE's.

Washpool NP, Single NP, Nowendoc NP and Indwarra NR have lower densities of feral goats, and fewer GVTE's and are considered low priority sites for feral goat control.

Control

Effective control of feral goats requires an integrated approach using several complementary control techniques. In the NTR, the main control techniques are aerial shooting, ground shooting, mustering and trapping. In addition, landholders adjacent to reserve boundaries are being encouraged to reduce feral goat numbers

through mustering and trapping, however the main source of reinvasion is from adjoining properties that do little or no control. Therefore, for areas such as Warrabah NP, Kwiambal NP, Ironbark NR and Severn River NR where migration is constant, aerial shooting programs will be conducted at least bi-annually to maintain or reduce the current goat density. Alternative exclusion options need to be investigated with neighbours to further reduce migration levels.

All feral goat control will be carried out in accordance with the appropriate Code of Practice and Standard Operating Procedures.

Monitoring

Changes in the relative abundance of feral goats are assessed during successive aerial shoots and trapping/mustering programs by comparing kills (cull rate compared from shoot to shoot) or captures per unit effort (time). The impacts of feral goats on vegetation and erosion have previously been investigated in the NTR, resulting in a number of publications, however no monitoring programs are currently in operation.

FERAL HORSE (*Equus caballus*)

Distribution and Abundance

In New South Wales, feral horses are a significant problem within a number of conservation reserves along the Great Dividing Range and eastern seaboard. English (2001a) estimated the population of feral horses in NSW as between 5000 and 8000 horses.

Feral horses occur within three NTR reserves, Oxley Wild Rivers NP, Guy Fawkes River NP and Nowendoc NP. The most significant population within the region is in Oxley Wild Rivers which is estimated to contain in excess of 600 horses. The majority of feral horses in Guy Fawkes River NP are within the portion of the park managed by the North Coast Region of NPWS, with only a small number in NTR. A very small population of feral horses (<20) graze on the periphery of Nowendoc NP with their home range predominantly in the NPWS Hunter Region or on adjoining private property.

Impacts

Feral horses accelerate erosion through trampling, compaction and grazing. They also impact on native vegetation and ground-nesting birds, foul water holes and contribute to the spread of weeds. In high altitude alpine herb fields trampling and grazing of bog and fen communities creates gully lines along horse trails that drain these sensitive communities. In water catchment areas, feral horse impacts accelerate soil erosion that increases sedimentation and potential transference of dangerous pathogens into water supplies. As horse density within conservation reserves increase their impacts on the environment become more significant.

In Oxley Wild Rivers, impacts in the form of compacted horse pads, disturbance of soil, stream bank damage and heavy grazing of native and introduced flora is evident. Soil erosion and increased weed growth has also been noted in areas frequented by feral horses.

Priorities for control

Oxley Wild Rivers NP has been identified as the highest priority for feral horse control in the NTR. In Guy Fawkes River NP, this region will work closely with North Coast Region to remove feral horses from the NTR portion of the park. A Feral Horse Management Plan has been adopted for both of these reserves.

Control

In OWRNP the initial control method has been the use of feed based lures to draw horses into portable trap yards. Captured horses have then transported from the park and made available to identified horse interest groups or individuals for re-homing. Other control techniques may be developed and utilised later in the program as required. All feral horse control will be carried out in accordance with the appropriate Code of Practice and Standard Operating Procedures.

Monitoring

The effectiveness of the horse removal program in Oxley Wild Rivers NP will be assessed by measuring changes in horse population, distribution and density, over time. Grazing exclusion plots, photo points and botanical surveys will be used to assess changes plant regeneration, species diversity and weed growth.

FERAL PIG (*Sus scrofa*)

Distribution and Abundance

Feral pigs are widely distributed throughout the northern slopes and tablelands, across all tenures. They have been recorded in more than 50 reserves throughout the NTR. Higher populations generally occur along watercourses, around swamps and in areas with adequate harbour such as blackberry, bracken and forest.

Impacts

Feral pigs, a declared pest animal in NSW, are a serious environmental and agricultural pest. Their habit of wallowing and rooting for food can cause soil erosion, silting and weed growth. They are known to predate on a number of native mammals, ground nesting birds, reptiles and amphibians.

Numerous endangered or threatened species within the NTR are susceptible to pig predation, as well as impacts to the Montane Peatlands and Swamps Endangered Ecological Community.

Feral pig impacts on agriculture include lamb predation and damage to crops, pasture, fences and watering points. They also act as carriers of endemic livestock diseases and are potential carriers of exotic disease. Because of these impacts and their large home range, feral pig activity on reserves can be a contentious issue with neighbours, requiring a cooperative approach for effective management.

Priorities for Control

Feral pig control is a high priority on all reserves where they occur within the NTR. Reserves to be included in regular control programs include Oxley Wild Rivers NP, Werrikimbe NP, Single NP, Mummel Gulf NP & SCA, Nowendoc NP, Warrabah NP, Kwiambal NP, Bald Rock NP, Boonoo Boonoo NP, Capoompeta NP, Washpool NP (west), Torrington SCA, Bolivia NR, Warra NP, Arakoola NR, Dthinna Dthinnawan NP, Kings Plains NP, Mount Yarrowyck NR, Ngulin NR, Booroolong NR and Ironbark NR.

Control

Fully integrated programs that utilise aerial shooting, trapping or poisoning as the primary control techniques will be used to control feral pigs in the NTR. A landscape approach to control will be utilized wherever possible, working cooperatively with the local LHPA and neighbouring land managers.

All feral pig control will be carried out in accordance with the appropriate Code of Practice and Standard Operating Procedures.

Monitoring

Feral pig populations and distribution will be monitored in reserves across the Region. Data relating to sightings and signs of pig activity such as rooting and wallowing will be recorded and entered into the regional pest database.

RED FOX (*Vulpes vulpes*)

Distribution and Abundance

Foxes are abundant throughout the NTR with the highest concentrations in the fragmented environment of agricultural areas. These areas offer a wide variety of food, cover and den sites. Fox densities are generally lower in mountainous, heavily forested areas, typical of the majority of NPWS estate in this Region.

Impacts

The fox is recognised as a serious environmental pest that is believed to predate on a number of native mammals, ground nesting birds, reptiles and amphibians. Endangered or threatened species, within the NTR, that may be susceptible to fox predation include the Hastings River Mouse, the Yellow-spotted Tree Frog, the Border Thick-tailed Gecko and the Brush-tailed Rock-wallaby.

Foxes may also compete with native carnivores such as the Spotted-tailed Quoll for food. They have also been implicated in the spread of blackberry and a number of other weeds.

As an agricultural pest, foxes can have a significant impact on newborn sheep or goats and on poultry. Recent studies have shown they can account for up to 30% of lamb deaths in some areas.

Further detail regarding fox impacts and management can be found in the Fox Threat Abatement Plan.

Priorities for Control

Priorities for management will concentrate on identified threats to endangered or threatened native species, or to livestock on neighbouring private properties.

The highest priority site in the NTR is the Little Llangothlin Nature Reserve (RAMSAR site).

Control

All fox control will be carried out in accordance with the appropriate Code of Practice and Standard Operating Procedures.

Control programs will be implemented in a cooperative manner, where neighbours and local pest animal control groups are involved and as a secondary target species in conjunction with wild dog control programs.

Control will utilise the buried bait station technique with 1080 poison, as the primary control method. Trail baiting, spotlight shooting, fumigation of dens and trapping will be secondary methods.

NPWS will support and participate in local and regional joint control initiatives and encourage landholders to participate in coordinated group control programs.

Monitoring

Surveys will be undertaken to measure:

- short term reduction in fox density during critical breeding periods for threatened species or during crucial lambing periods.
- change in Spotted Tail Quoll populations, and other vulnerable or threatened species such as the Hastings River Mouse.

RABBIT (*Oryctolagus cuniculus*)

Distribution and Abundance

Rabbit populations are essentially contiguous throughout the New England and Northern Slopes finding their highest density in semi-open grazing country. They are present at low to very low densities on numerous reserves throughout the NTR.

Impacts

Rabbits have significant impacts on native vegetation. Selective grazing and browsing of more palatable species leads to changes in species composition and habitat structure and even at low densities, rabbits can prevent the regeneration of impacted species through consumption of seed and seedlings. During drought, rabbits will also consume the bark and roots of native species, resulting in the death of large numbers of plants. Their digging activities also scratch out seedlings and damage root systems and combined with the damage they cause to both above and below ground vegetation, can lead to increased soil erosion. The resultant habitat degradation in turn affects native fauna, which may also be impacted by rabbits through competition for food and shelter. Rabbits also provide a food source for cats and foxes, maintaining high numbers of these introduced predators, which in turn impact on native prey species.

Competition and grazing by European rabbits has been listed as a *key threatening process* under the NSW *Threatened Species Conservation Act* and rabbits are also a declared a pest animal under the *Rural Lands Protection Act 1998*. Rabbits can cause damage to Aboriginal heritage sites, compete with neighbouring livestock and impact forestry operations. The impacts of rabbits have been reduced since the release of myxomatosis and more recently rabbit haemorrhagic disease (RHD), however even at low densities rabbits can prevent the regeneration of impacted plant species and recent reports suggest rabbit numbers may be increasing again.

Priorities for Control

The density of rabbits is low to very low on most reserves in the NTR and in many cases it is far higher on adjoining private property. Consequently a priority will be given to undertaking rabbit control where it is a part of a coordinated program across all tenures. Medium priority sites in the NTR are Oxley Wild Rivers NP, Booroolong NR, Little Llangothlin NR, Bolivia Hill NR, Washpool NP (west), Severn River NR, Dthinna Dthinnawan NP, Linton NR, Imbota NR and Torrington SCA.

Control

Effective control of rabbits requires an integrated approach using several complementary control techniques. In NTR, the main control techniques used will be warren ripping, warren fumigation and baiting. All rabbit control will be carried out in accordance with the appropriate Code of Practice and Standard Operating Procedures.

Monitoring

The location of warrens and above ground harbour where rabbits are seen to shelter will be mapped during field inspections. This data will be entered into the regional pest database. Rabbit population abundances will be monitored using spotlight counts, walk transect counts, counts of warrens and counts of active entrances.

WILD DOG (*Canis lupus spp.*)

Distribution and Abundance

Populations of wild dogs (including dingoes) occur mainly along the Great Dividing Range, coastal hinterlands, and in north-western NSW. In the NTR they occur on private and public lands and are most prevalent in densely timbered areas along the escarpment. In recent years, sightings and predation have been increasing on the western slopes and plains in areas such as Bingara, Warialda, Coolatai and Yetman.

Wild dogs are present in many reserves within NTR, from Cataract NP in the north through Washpool NP, Gibraltar Range NP, Oxley Wild Rivers NP to Nowendoc NP in the south. Most of these reserves are included under Schedule 2 of the Wild Dog Pest Control Order.

Impacts

Wild dogs, including dingoes, can cause substantial losses to livestock enterprises, especially sheep and goat grazing operations. These impacts are widespread in the eastern half of the NTR, with the heaviest losses occurring where forested and gorge areas interface with fine wool sheep country. The western boundary of OWRNP, which encompasses much of the Macleay gorges, typifies this interface with the adjoining open grazing country of the New England Tablelands between Armidale and Walcha.

The impacts of wild dogs on native species appear to be greatest on large mammals, such as kangaroos and swamp wallabies, large ground-dwelling birds, such as emus and terrestrial wetland birds. Regulation of large herbivores by wild dogs in fragile arid and semi-arid environments may benefit biodiversity by reducing the impacts of overgrazing. Wild dogs also have the potential to suppress populations of pest species such as feral goats, pigs and foxes, although quantitative evidence of this is limited.

In contrast, predation by wild dogs may have negative impacts on some threatened species. For example, dog predation can be a high source of mortality in koala populations and when combined with habitat fragmentation has the potential to cause local extinctions. While no major impacts on biodiversity have been recorded in the NTR, wild dogs have been identified as a potential threat to Brush-tailed Rock-wallaby (BTRW) populations in the Green Gully area of OWRNP.

Priorities for Control

Wild dogs, including dingoes, have been declared as a pest animal under the *Rural Lands Protection Act (1998)* and they must be controlled on Crown lands (see Section 3.3 of the Act). However, the dingo is unprotected under Schedule 11 of the *National Parks and Wildlife Act 1974*, it is a native animal, and there is a requirement for it to be conserved both on NPWS managed lands and within NSW generally.

Wild dog management plans are prepared in conjunction with the local LHPA and Wild Dog Control Associations (WDCA). The plans include the dual aims of minimising livestock predation and the conservation of the dingo in the core areas of all reserves listed under Schedule 2 of the Wild Dog Pest Control Order. While the overarching management plans are developed by the LHPA, operational plans are negotiated with individual WDCAs on an Association area basis.

Priorities for wild dog control on reserves in the NTR are based primarily on the level of livestock predation reported by adjoining landholders, in accord with the relevant

wild dog management plans. Control will be focused on reserves where there are current and/or historic records demonstrating significant impact on livestock from wild dogs emanating from the reserves. There will be close liaison with the local WDCA and landholders when developing control programs.

Priority will also be given to protection of BTRWs in the Green Gully area of OWRNP. If research indicates that predation by wild dogs does pose a significant threat, control will be undertaken to ensure to the long-term viability of these populations.

Control

A fully integrated suite of control techniques will be used to manage wild dogs within the NTR. Control programs will be undertaken in partnership with the local LHPA, WDCA and individual landholders. Strategic control, aimed at preventing future livestock predation, will include:

- Exclusion or barrier fencing where the terrain is suitable and there is sufficient support from neighbouring landholders;
- Aerial baiting in the more rugged inaccessible areas where other control techniques may not be cost-effective; and
- Ground/mound baiting and trapping in accessible areas.

Reactive control in response to reports of livestock predation or dog activity will include:

- Ground or mound baiting;
- Trapping using either NPWS staff or contract trappers; and
- "Howling up" and shooting.

Monitoring

Stock losses due to predation by wild dogs are reported monthly to the LHPA by each WDCA. This information is used by the region to evaluate the effectiveness of control programs negotiated as part of the wild dog management planning process.

Wild dog abundance and activity on reserves is monitored via track counts, remote cameras, sightings and bait takes from mound bait stations. This data is entered in the pest database and used to refine wild dog control programs.

Research undertaken by the Invasive Animal Cooperative Research Centre, using satellite collaring and other monitoring techniques, has provide valuable additional data in relation to the movements and response to control of wild dogs and other predators. In this region the initial research has been undertaken in Walcha Area with extensive support from local staff. From 2012 the research will be extended in to reserves within the northern part of the Region.

Weed Species Programs

The weeds described below as Noxious are declared under the *Noxious Weeds Act 1993* in one or more of the Local Government Areas (LGA) within the Northern Tablelands Region. The "Control Class" allocated to a particular weed may vary in different LGAs. Other weeds are listed as "environmental weeds" due to their known impact on biodiversity.

AFRICAN LOVEGRASS (*Eragrostis curvula*)

Distribution and Abundance

African Lovegrass is a widespread weed in the Tenterfield LGA, with small scattered infestations being present in the Bald Rock NP and Boonoo Boonoo NP. Infestations are also located in other reserves within NTR. Roadside slashing and burning on access roads to National Park areas has increased the density and distribution of this weed dramatically over the previous 10 years, and is the main dispersal method for this weed in the Tenterfield area.

Impacts

This summer growing perennial grass establishes from seed and has the potential to invade native communities by forming dense swards of tussocks. This weed is extremely aggressive, and has the ability to out compete many native grasses, particularly after fire or drought events when native flora species are suppressed. Seed dispersal is facilitated by machinery and vehicles, warranting hygiene measures to be implemented to reduce seed spread. African Lovegrass is a declared noxious weed.

Priorities for Control

- Areas where infestation levels are minor and scattered such as Bald Rock and Boonoo Boonoo National Parks and Curry's Gap SCA.
- Boundary areas where infestations in neighbouring lands are encroaching onto NPWS managed lands.

Control

- Map infestations on a regional basis.
- Vehicle and machinery hygiene is essential to reduce the spread of this weed. Vehicles or machinery that travel through infested areas should be thoroughly washed down before moving to areas where this weed is not present.
- Fostering the competitive ability of native species. This will provide competition for African Lovegrass and reduce re-invasion levels.
- Established infestations are best treated with herbicide in February and March, preferably with wick application. Spot spraying is not selective and will remove all competition, resulting in quick re-invasion. Hand chipping can be used where infestations are small.
- Cooperative programs with neighbours and local councils should be encouraged to suppress and control this weed.

Monitoring

- Reduction in distribution and density as confirmed by mapping of annual control programs.

BLACKBERRY (*Rubus fruticosus (agg)* spp*. fruticosus*)

Distribution and Abundance

The term 'blackberry' covers at least 14 different but closely related species, including hybrids that have become naturalised in Australia.

It rarely invades virgin bushland but readily establishes in disturbed areas on agricultural lands, roadsides, banks of watercourses, forests and bushland. It is common throughout temperate Australia in areas where rainfall is greater than 750 mm per annum. Blackberry is widespread on the slopes and tablelands and occurs in numerous reserves in NTR.

Impacts

Blackberry is a Weed of National Significance because of its invasiveness, potential for spread, and economic and environmental impacts. It is listed under the *Noxious Weeds Act* throughout most of NSW.

Blackberry is a sprawling perennial shrub that has long thorn covered stems (canes) that can form large thickets which exclude light from the soil surface. Thickets can grow to several metres high and seriously impede regeneration of native flora species through competition for moisture, soil nutrients and light. Large, dense infestations can restrict access to watercourses by native fauna and park users.

It also provides significant harbour for rabbits, foxes, feral pigs and other pest animal species.

Priorities for Control

Blackberry is a high priority for control on reserves within the Northern Tablelands Region. Major control programs include programs in the Guy Fawkes River NP, Little Llangothlin NR, Bald Rock NP, Boonoo Boonoo NP, Curry's Gap SCA, Warra NP, Oxley Wild Rivers NP, Boorolong NR, Nowendoc NP and Werrikimbe NP. Priorities for control include:

- New or emerging infestations, or where current distribution is limited;
- Areas where conservation values are threatened;
- Areas where public access to natural features is restricted;
- Previously treated areas that require adequate follow-up control to prevent reinfestation.

Control

- Reduce distribution and potential to spread by treatment with herbicide;
- Carry out follow-up treatment as required for a minimum of 10 years or until there is no further regrowth;
- Trial bio-control agents to determine effectiveness as a control measure.

Monitoring

- Map the distribution of blackberry on NPWS estate;
- Establish photo-points to monitor re-establishment;
- Regular surveys to measure changes in distribution and density;
- The quantity of herbicide used at each location, measured annually.

CATS CLAW CREEPER (*Macfadyena unguis-cati*)

Distribution and Abundance

This environmental weed is present in the north east section of Cataract NP along Tooloom Creek. Further north along the Clarence River in private country, this weed is having a major impact on the riparian community. This weed also occurs along the eastern fringes of Guy Fawkes River NP at Dalmorton in the North Coast Region, and there are isolated infestations located around abandoned forestry houses on the western boundary of Dthinna Dthinnawan NP.

Impacts

This vine forms dense mats over trees and threatens the biodiversity of riparian and rainforest communities. It spreads rapidly along the fringing tree lines of watercourses choking vegetation, killing trees and contributing to bank erosion and siltation.

Large underground tubers produce climbing runners that form a thick carpet of stems and leaves that choke out small existing plants and stops germination of all species. The large climbing stems through a combination of weight and shading cause the eventual death of the largest canopy trees.

Priorities for Control

- Isolated infestations on NPWS estate.
- Boundary areas where infestations in neighbouring lands are encroaching onto NPWS estate.

Control

- Map current infestations across NTR.
- Contain and reduce present infestations with strategic herbicide application.
- Monitoring and frequent follow-up control is necessary for a minimum of five years.
- Monitor the progress of infestations in riparian areas within 1 kilometre of National Park boundaries and encourage cooperative control with neighbours to prevent dispersal of the weed onto NPWS estate.

Monitoring

- Containment of existing infestation and reduction in distribution and density as confirmed by mapping of annual control programs.

COOLATAI GRASS (*Hyparrhenia hirta*)

Distribution and Abundance

Coolatai grass is an aggressive weed that has become established in many reserves across the NTR. It is more prevalent in western reserves as the weed was originally introduced into the Coolatai area. However, this weed is now common in eastern reserves both above and below the escarpment. The most common dispersal method is by vehicle and stock movement along roadsides and stock routes.

Impacts

This weed, due to its ability to spread rapidly, it is quickly dominating grassy box woodland habitats and other vegetation communities. This weed completely smothers existing vegetation, is drought tolerant and is one of the major threats to native pasture and woodland biodiversity.

Priorities for Control

- Isolated infestations or new incursions where effective control will prevent further distribution of the weed (e.g. Guy Fawkes River NP, Nymboida NP, Mummel Gulf NP, Cottan-bimbang NP and Oxley Wild Rivers NP).
- Where infestations are impacting upon the conservation values of an area.
- Riparian areas where downstream effects will significantly boost distribution.

NB. Coolatai Grass occurs in Dthinna Dthinnawan CCA, Mt Yarrowyck NR, Linton NR, Arakoola NR, and Kwiambal NP and is considered a major pest, but due to its extensive distribution in these areas control programs are not performed.

Control

- Vehicle and machinery hygiene is essential to reduce the spread of this weed. All vehicles or machinery that travel through infested areas should be thoroughly washed down before moving to areas where this weed is not present.
- Fostering the competitive ability of native species. This will provide competition for Coolatai Grass and reduce re-invasion levels.
- Established infestations are best treated with glyphosate when plants are actively growing in February and March, preferably with wick application. Spot spraying is not selective and will remove all competition, resulting in quick re-invasion. Hand chipping can be used where infestations are small.
- Cooperative programs with neighbours and local councils should be encouraged to suppress and control this weed.

Monitoring

- Map current infestations across the NTR.
- Containment of existing infestation and reduction in distribution and density as confirmed by mapping of annual control programs.

CROFTON WEED (*Ageratina adenophora*)

Distribution and Abundance

Crofton weed, a native of Mexico, is now widespread in coastal areas from southern Queensland to Wollongong in New South Wales. Isolated infestations occur on the northern and central tablelands. This weed has been recorded mainly in eastern escarpment reserves within the NTR, primarily in the Glen Innes and Walcha areas. The infestations usually occur in disturbed areas, particularly along roadsides.

Impacts

Crofton weed is an aggressive plant that competes successfully with native flora species. It forms dense swards where conditions suit, excluding native species. The effectiveness of control programs is often limited due to access problems created by the plants' preference for steeply sloping areas with rainfall in excess of 1500 mm per annum.

Priorities for Control

The control of Crofton weed is generally considered to be of low to medium priority in NTR. Control of Crofton weed will aim to prevent any new infestations establishing and setting seed. Priority will also be given to the control of smaller isolated infestations where there is adequate access for spraying equipment.

Control

Control techniques suitable for Crofton weed management in conservation areas include mechanical, chemical and biological.

- Contain present infestations with strategic herbicide application.
- Treat as priority any new, isolated infestations.
- Investigate the use of biological control options such as the spot fungus (*Cercospora eupatoris*).

Monitoring

Infestations of Crofton weed will be systematically mapped and monitored to identify any changes to distribution or density.

GIANT PARRAMATTA GRASS (*Sporobolus indicus v. major*)

Distribution and Abundance

Giant Parramatta Grass, a significant weed of the north coast of NSW, occurs in numerous reserves along the eastern escarpment and also occurs in some western reserves.

Seed dispersal is facilitated by machinery and vehicles, warranting the implementation of hygiene measures to reduce transportation of seed.

Impacts

Giant Parramatta Grass is an aggressive perennial weed that has invaded large areas of land on the north coast of NSW. An extremely prolific seeder, it has the potential to colonise large areas of NPWS estate, dominate native species and alter the fire regime. It can dominate disturbed areas such as fire trails and roadsides where seed is frequently transported due to vehicles and machinery.

Giant Parramatta Grass is a declared noxious weed.

Priorities for Control

- Frequently used access trails (to reduce spread to other areas).
- Areas where low density populations exist and native flora species have good natural regeneration ability.

Control

- Selectively treat (wick wiper) existing infestations with herbicide to encourage competition from native species.
- Prevent Giant Parramatta Grass from becoming established in new areas on NPWS estate.
- Train all field-based staff to identify Giant Parramatta Grass to ensure early detection of any new infestations.
- Prevent further spread by:
    - erecting temporary fencing and signs at each infestation;
    - ensure vehicles operating in the area are inspected and cleaned before moving to new areas; and
    - reducing the unauthorised use of management trails.

Monitoring

- Map the distribution of Giant Parramatta Grass on reserves within the region.
- Reduction in distribution and density as confirmed by mapping of annual control programs.

HONEY LOCUST (*Gleditsia triacanthos*)

Distribution and Abundance

This weed occurs in several reserves in the Glen Innes and Tenterfield areas.

The tree is found predominantly in riparian areas and is found on the banks of the Severn, Macintyre and Mann Rivers, and is rarely found at distances of more than 400 metres from a watercourse.

The populations in all areas consists mostly of mature Honey Locust trees (up to 6 metres high), with high numbers of seedlings present in some areas. Control programs have drastically reduced infestations along the Severn, Macintyre and Mann River's, however this weed is still a major problem in these areas.

Impacts

This weed is an invasive tree capable of out-competing and replacing native vegetation. It is a serious pest and when disturbed mechanically or by fire, it can produce dense regrowth, eventually forming impenetrable thickets. Seed is spread by flood waters or by stock and feral animals that eat the seed and pass it in their dung.

Long spines along the branches and trunk can inflict painful injuries to humans and native fauna species. Honey locust is a declared noxious weed.

Priorities for Control

- High priority for control in Mann River NP and Barool NP (both follow-up and initial control).
- Infestations in Severn River NR and Kwiambal NP are at low densities due to intensive control programs over the previous 10 years. Follow up control is still required to reduce re-establishment.

Control

- Herbicide application using basal bark application for mature trees or foliar application for seedlings when trees are actively growing.
- Participation with neighbours and catchment management initiatives to reduce establishment of new infestations on NPWS estate.
- Extensive follow-up control necessary for a minimum of 5 years to reduce seedling growth to prevent re-establishment of this weed.

Monitoring

- Map distribution on NPWS estate, on a region-wide basis.
- Reduction in distribution and density as confirmed by mapping of annual control programs (local eradication considered possible in some areas).

LANTANA (*Lantana camara L.*)

Distribution and Abundance

Lantana is widely distributed east of the Great Dividing Range along the coastal strip from Eden on the south coast of NSW to Cooktown in northern Queensland. Isolated infestations have been reported in the Northern Territory, Western Australia and Victoria. In the NTR it occurs in most reserves along the eastern fall country at altitudes below 750 metres. Population densities are greatest in open forest or disturbed temperate rainforest communities. Lower density lantana infestations occur on dry slopes adjoining open forest communities. Most infestations of lantana are the common pink type, apart from several small populations of pink-edged red lantana in Oxley Wild Rivers National Park.

Impacts

Lantana is listed as a Weed of National Significance due to its impact on primary industries, conservation and biodiversity. In natural ecosystems lantana infests forest edges and riparian areas, penetrates disturbed rainforest and invades open woodland. Its dense thickets exclude native species through smothering and allelopathic effects, dominate understoreys and reduce biodiversity. The lantana thickets also increase the intensity of wildfire and provide harbour for pest animals such as feral pigs.

Lantana is a major threat to the dry rainforest remnants which are part of the Gondwana Rainforests of Australia and listed as a World Heritage Area. It is a declared noxious weed.

Priorities for Control

The control of lantana is generally considered to be a high priority in the NTR.

Priority will be given to the control of lantana where:

- it poses a threat to high conservation value areas such as the Gondwana dry rainforests;
- it is impacting on riparian zones or reducing access to watercourses by native animals or park users;
- it is a smaller isolated or new infestation that can potentially be removed completely; and
- it is impacting on public or management access along roads or trails.

To date a high priority has been given to areas of Oxley Wild Rivers NP, Washpool NP, Gibraltar Range NP, Nymboida NP Guy Fawkes River NP and Georges Creek NR.

Control

An integrated approach is taken to the control of lantana in the NTR. Foliar application of herbicide is used where there is access for spraying equipment and the size of the infestation makes this method viable. Hand-pulling has been used to remove small numbers of isolated plants.

Biological control agents will be released into larger infestations where other control techniques are impractical due to restrictions on access or the extent of the infestation. Three bio-control agents have already been released in the Region, a leaf-mining beetle, a stem-sucking bug and a rust.

Monitoring

Lantana infestations will be progressively mapped on all reserves within the Region. Annual control programs will also be mapped and the data entered into the regional pest database. This information will be used to monitor changes to the distribution and/or density of lantana within the Region and the effectiveness of control programs.

MOTHER OF MILLIONS (*Bryophyllum* spp.)

Distribution and Abundance

Mother of Millions occurs in several reserves in the Armidale and Tenterfield areas. Minor infestations are present in Kwiambal NP, Goonoowigal SCA and Bingara SCA while a more serious infestation occurs in Dthinna Dthinnawan NP

Impacts

These plants have the capacity to spread quickly and to form dense colonies, especially in leaf litter or shallow soils in shady woodlands. Dense colonies exclude native flora species from establishing. Due to their drought tolerance and reproductive ability, this weed is very persistent and continues to reproduce in most conditions. This plant is toxic to stock.

Mother of Millions is a declared noxious weed.

Priorities for Control

- Frequent follow up control is necessary to prevent this weed dispersing over a larger area within Kwiambal NP and Bingara SCA.
- Containment of the infestation in the Dthinna Dthinnawan NP and strategic control to prevent further spread.

Control

- Map distribution of infested areas.
- Limit access to infested areas to reduce further spread by vehicles or equipment.
- Use herbicide to control this weed where infestations are small. Alternatively, small colonies can be pulled by hand. Plants which are hand-pulled must be carefully removed and destroyed or they can re-establish where they are left. Biological control (citrus thrip) or controlled burning followed by herbicide treatment should be used for large infestations.
- Burn treated infestations to reduce seedling growth.
- Monitoring and frequent follow-up control is necessary for a minimum of 5 years.
- Participate with neighbours and catchment management initiatives to reduce establishment of new infestations.

Monitoring

- Reduction in distribution and density as confirmed by mapping of annual control programs.
- Photo points to monitor re-infestation and effectiveness of long term control.

MYSORE THORN (*Caesalpinia decapetala*)

Distribution and Abundance

Mysore thorn (also known as Thorny Poinciana) has limited distribution in the NTR. It is found in Nymboida National Park and is located on private property close to the Guy Fawkes River National Park. In Queensland this weed is listed as a major pest species, occurring in the Brisbane, Yeppoon and Toowoomba districts.

Impacts

This deciduous, sprawling noxious shrub, with numerous spines, forms impenetrable thickets limiting animal movement and smothering other plants. Its branches are covered with inward facing barbs which can ensnare native mammals and cattle. It can smother native flora species and invades forest communities in riparian areas. Heavy infestations along riverbanks are likely to affect stream flow.

Mysore thorn is a declared noxious weed.

Priorities for Control

- Nymboida National Park.
- Where infestations are limited or are a new incursion and effective control will prevent further distribution of the weed.
- Where infestations are likely to spread onto adjoining private property.

Control

- Map current infestations across the NTR.
- Contain and reduce present infestations with strategic herbicide application.
- Monitoring and frequent follow-up control is necessary for a minimum of 5 years.
- Participate with neighbours and catchment management initiatives to reduce establishment of new infestations on NPWS estate and neighbouring lands.

Monitoring

- Reduction in distribution and density as confirmed by mapping of annual control programs.

NODDING THISTLE *(Carduus nutans)*

Distribution and Abundance

Nodding thistle, a native of Europe, northern Africa and parts of Asia is found in the higher rainfall tableland areas of NSW and in Victoria and Tasmania. In the NTR it has been recorded in 7 reserves –, Mummel Gulf NP, Nowendoc NP, Mother Of Ducks NR, Ngulin NR, Tuggolo Creek NR, Booroolong NR and Little Llangothlin NR. All infestations are limited to small isolated areas, mostly with low plant density and have been subject to annual control programs.

Impacts

Nodding thistle is regarded as a serious environmental and agricultural weed. It grows in dense patches that reduces access and alters species composition. Nodding thistle produces allelopathic compounds that depress other plants.

Priorities for Control

As the distribution of Nodding thistle is limited to very small area in each reserve, a high priority will be given to the control of all infestations with the aim of preventing the weed becoming established.

Control

- Treat existing infestations with herbicide treatment, chipping and/or hand-pulling where plants are in low numbers.
- Ensure control is completed prior to seed set each year.

Monitoring

- Monitor likely areas for new infestations.
- Continue to closely monitor known locations during the growing season and immediately treat any plants that are detected.
- All known infestations of Nodding thistle will be mapped and monitored annually to ensure there is no increase in distribution or density.

OSAGE ORANGE (*Maclura pomifera*)

Distribution and Abundance

This weed infestation is found in Kwiambal NP and the Severn River NR.

This weed is found predominantly on the banks of the Severn and Macintyre Rivers in the above areas. It is more prevalent in Kwiambal NP, with the majority of the population being located on the Macintyre River. There are scattered trees on the Severn River. Seedling growth and spread of this weed appears to be limited.

Impacts

This tree grows to a height of 6-8 metres when mature, and due to its multi-stemmed nature, can form dense infestations if left uncontrolled. Due to its preference for growing in riparian areas, it can restrict access and eventually block small waterways. The semi-sprawling growth pattern of this tree reduces the ability of native vegetation to re-establish.

Priorities for Control

- Macintyre River in Kwiambal NP.
- Follow up control along the Severn River in Kwiambal NP.

Control

- Map distribution in affected areas.
- Control utilising herbicide application carried out in conjunction with neighbours.
- Encourage cooperative control with neighbours.

Monitoring

- Reduction in distribution and density as confirmed by mapping of annual control programs.
- Local eradication in riparian areas considered possible.

PRICKLY PEAR SPP. *(Opuntia spp.)*

Distribution and Abundance

Common prickly pear (*O. inermis*), Tiger pear (*O. aurantiaca*) and Smooth Tree Pear (*O. monacantha*) are widespread on the northern slopes and tablelands. They occur in both eastern escarpment areas and western areas, but are more common in western reserves where the drier climate and shallow soils suit establishment of these weeds. Reserves around Bingara generally have a higher density of pear, particularly Tiger and Tree pear, than reserves in other parts of the region

Populations vary from scattered individual plants to larger patches.

Impacts

Prickly pear is regarded as a serious environmental and agricultural weed. Dense patches can form an impenetrable barrier to native animals, livestock and humans. It can also act as harbour for rabbits and other pests.

Prickly pear is a declared noxious weed.

Priorities for Control

The control of prickly pear is generally considered to be of low to medium priority in NTR.

A higher priority will be given to the control of isolated new infestations to prevent the pear from becoming established in new locations.

Priority will also be given to the control of established infestations where there is a significant impact upon the conservation values of the reserve, threatened flora or fauna species or it is necessary for other identified management purposes.

Control

An integrated approach will be used to control prickly pear in the NTR.

The biological control agents Cactoblastis (*Cactoblastis cactorum*) and Cochineal (*Dactylopious opuntiae)* will be the primary method for control of large established infestations of pear. Where necessary, the manual transfer of segments of pear infected with the bio-control agents will be used to assist spread to other infestations.

Tiger and Tree pear in the Bingara and Gwydir River reserves will be controlled using herbicide to reduce overall density and distribution and prevent spread onto adjoining private lands.

Herbicide will be used to treat small isolated patches of common pear, where there is no evidence of biological control agents or there is an identified need for a more rapid removal of the pear.

Monitoring

Monitoring of prickly pear will be limited to observations by field staff of the density and distribution of the weed. The distribution and effectiveness of bio-control agents will also be monitored.

PRIVET (*Ligustrum lucidum*)

Distribution and Abundance

This weed is present in the Kings Plains NP, Barool NP and Oxley Wild Rivers NP. In Kings Plains an infestation occurs along Kings Plains Creek on the northern boundary of the park, and continues into private property along the creek.

In Barool NP this weed occurs along the Mann River opposite “Wyatliba”. A minor, low density population also occurs in the Gara Gorge visitor area of Oxley Wild Rivers NP.

Impacts

This weed colonises gullies, creek banks, bushland and pasture, causing damage to native vegetation by forming dense infestations and out competing native vegetation. The dense colonies formed by this weed prevent any re-establishment by native species. Privet is suspected of being poisonous, and is known to cause hay fever. It is a declared noxious weed.

Priorities for Control

- Kings Plains Creek (Kings Plains NP);
- Barool NP (Mann River);
- Gara Gorge visitor area, Oxley Wild Rivers NP.

Control

- Map all privet on NPWS estate, on a regional basis.
- Herbicide treatment with either cut-stump or stem injection for mature trees, or foliar application for seedlings.
- Follow-up treatment for a minimum of five years is necessary due to the large seed bank present.

Monitoring

- Reduction in distribution and density as confirmed by mapping of annual control programs (local eradication considered possible).

SERRATED TUSSOCK (*Nassella trichotoma*)

Distribution and Abundance

Serrated tussock is a common weed on the Northern Tablelands and has established on many private properties. It has been recorded in two reserves in NTR, Imbota NR and Yina NR. Both infestations are very limited in area and are regularly monitored and controlled to prevent seed set. Serrated tussock has been identified on numerous private properties adjoining these and other reserves.

Impacts

Serrated tussock is a weed that dominates native pasture, seeds prolifically and is unpalatable to herbivores. It competes with native species and can impact on the conservation values of natural areas.

Serrated tussock is a declared noxious weed. The New England Weeds Authority has an extensive and effective program operating to contain and eventually eradicate this weed in their LGA.

Priorities for Control

A high priority will be given to preventing serrated tussock from becoming established in Imbota NR and Yina NR. . The current very effective annual control program has limited the infestations to a small section of each reserve and reduced the density to a minimum number plants germinating each year.

Control

- Control all serrated tussock plants with herbicide application, chipping or hand-pulling, prior to seed set.
- The area of the infestation will be inspected regularly during the growing season to ensure early detection of any new germinations of the weed.
- Inspection of other NPWS estate for this weed, particularly in areas where adjoining private property has serrated tussock infestations.
- All control and monitoring will be undertaken in close cooperation with the New England Weeds Authority.

Monitoring

- Map the current infestation in Imbota NR and Yina NR.
- Regular inspections to monitor for any changes in distribution or density.
- Monitor other reserves that are under threat of invasion by serrated tussock from adjoining private properties.

ST JOHN'S WORT (*Hypericum perforatum*)

Distribution and Abundance

The heaviest infestations of St John's Wort in New South Wales are along the tablelands and slopes. In NTR it occurs in Barayamal NP, Bingara SCA, Nowendoc NP, Melville Range NR and Mother of Ducks Lagoon NR. It is also in close proximity and poses a threat to Kings Plains NP, Cottan-Bimbang NP and Mummel Gulf NP.

Impacts

St John's Wort is a serious agricultural and environmental pest. It is a highly prolific seeder, out competes native flora species and is toxic to livestock.

The weed spreads by seed and by lateral roots. Seeds have a sticky coating and can adhere to native fauna or livestock and be dispersed long distances. Seeds can also be transported in the digestive tracts of animals.

St John's Wort is a declared noxious weed.

Priorities for Control

Effective control programs have reduced the infestation of St John's Wort at the Mother of Ducks Lagoon to a few plants. It will be a high priority to continue with this control work until the weed is eradicated from the reserve.

Priority will also be given to ongoing control programs in Nowendoc NP which have also significantly reduced the distribution and density of this weed.

St John's Wort is widespread on a number of properties adjoining in the Bingara SCA and Gwydir River NP but has not established in the reserves. A priority will be given to control of the limited number of isolated plants within the reserves.

Control

Foliar application of herbicide is the most effective control method. Follow-up control must be undertaken at least once during the growing season (preferably twice).

Monitoring

- All infestations in and near NPWS estate will be mapped and monitored for changes in distribution and density.
- All known infestations will be monitored during the growing season and any plants that are detected will be immediately treated with herbicide to prevent seed set.
- Susceptible NPWS areas will be monitored for new infestations, particularly Bingara SCA, Kings Plains NP, Cottan-Bimbang NP and Mummel Gulf NP.

TREE OF HEAVEN (*Ailanthus altissima*)

Distribution and Abundance

This weed occurs in several reserves in the NTR. This weed is usually found in riparian areas, and is common along the Severn River in both Kwiambal NP and the Severn River NR. It has also been recorded in Goonoowigal NR and Barayamal NR, Oxley Wild Rivers NP, Nowendoc NP, Melville Range NR, Gwydir River CCA and Arakoola NR.

Trees in the above areas occur in dispersed clumps and vary in age from seedlings to mature trees up to 3.5 metres high.

Impacts

This weed has an aggressive nature, and can colonise areas rapidly by suckering. This weed is an important competitor for light and nutrients, and as the leaves contain allelopathic substances, growth of competing plants is inhibited, therefore encouraging growth of monospecific stands. Direct contact with the plant can cause dermatitis.

Priorities for Control

- Goonoowigal NR and Barayamal NR.
- Gwydir River CCA – follow up to major control work commenced in 2009/10.
- Oxley Wild Rivers NP and Nowendoc NP.
- Initial control programs commenced in 1999 and annual follow up control is necessary in Severn River NR, Arakoola NR and Kwiambal NP.

Control

- Treat existing infestations with appropriate herbicides.
- Follow-up treatment to be conducted for a minimum of 5 years as re-growth from suckers is persistent.

Monitoring

- Map distribution of known infestations on a region-wide basis.
- Reduction in distribution and density as confirmed by mapping of annual control programs.

TROPICAL SODA APPLE (*Solanum viarum* Dunal)

Distribution and Abundance

This is a new weed identified in the Macleay catchment in 2010, from Georges Creek through to Kempsey. Distribution on reserves is limited to small sections of Georges Creek NR and Oxley Wild Rivers NP.

Impacts

Tropical soda apple is an aggressive prickly shrub that invades open and semi shaded areas, including pastures, forests, riparian zones, roadsides, recreational and agricultural areas. It reduces biodiversity by displacing native flora and disrupting ecological processes. It is unpalatable to livestock and the prickles restrict the movement of both native and domestic animals. The plant is a host for many diseases and pests of cultivated crops and it is poisonous to humans.

Priorities for Control

As Tropical soda apple is a new weed with very limited distribution on NPWS estate, control and eradication in both Oxley Wild Rivers NP and Georges Creek NR is a very high priority for the region.

Control

Extensive control was commenced in 2010 when the weed was first identified with followed up control in early 2011. Larger patches of the weed in the more accessible areas were controlled using foliar application of a woody weed herbicide. Smaller patches and isolated plants were grubbed or pulled, fruit was collected and destroyed. All known occurrences of Tropical soda apple have now been treated and control is focussed on detecting and removing new germinations before they can set seed.

Monitoring

Regular monitoring for new germinations of Tropical soda apple is a key part of the strategy for control and eradication of this weed. All locations where the weed has previously mapped or it is likely to occur are inspected every month in Georges Creek NR and every three months in Oxley Wild Rivers NP.

WHISKY GRASS (*Andropogon virginicus L*)

Distribution and Abundance

Whisky grass is a widespread weed on the Northern Slopes and Tablelands with infestations common along roadsides, railways, low fertility marginal lands and overgrazed native pastures. Infestations occur in numerous reserves in the Region, including: Boonoo Boonoo, Oxley Wild Rivers NP, Kings Plains NP, Gibraltar Range NP and Bolivia Hill NR. Scattered infestations also occur in numerous other reserves.

Impacts

This perennial grass is unpalatable to native fauna species, and is an effective competitor with native grasses such as Kangaroo Grass and Native Sorghum, particularly after fire or drought events when native flora species are suppressed. Infestations can become severe, particularly following major fire events. Achieving effective control, particularly where large, scattered infestations exist is difficult.

Seed is easily caught in animal fur which facilitates dispersal. In addition, machinery and vehicles contribute to the spread of this weed. This weed currently has no classification under the *Noxious Weeds Act*.

Priorities for Control

- Areas where infestations are limited such as Kings Plains NP, Gibraltar Range NP and Martins Flat in Boonoo Boonoo NP.
- Bolivia Hill NR.

Control

- Vehicle and machinery hygiene is essential to reduce the spread of this weed. Vehicles or machinery that travel through infested areas should be thoroughly washed down before moving to areas where this weed is not present.
- Established infestations are best treated with herbicide, preferably with wick application. Spot spraying is not selective and will remove all competition, resulting in quick re-invasion. Hand chipping can be used where infestations are small;
- Cooperative programs with neighbours and local councils should be encouraged to suppress and control this weed.

Monitoring

- Infestations will be mapped on a regional basis.
- Reduction in distribution and density as confirmed by mapping of annual control programs.
- Photo points to monitor re-infestation and effectiveness of long term control.

WILLOWS (*Salix* species).

Distribution and Abundance

More than 100 species of willows have been deliberately introduced into this country for landscaping, nurseries or shade and shelter for livestock. At least a dozen of these species and their hybrids are now widespread in south-eastern Australia. They occur in varying densities along rivers, creeks and other watercourses in many reserves within the NTR.

Impacts

Willows pose a major threat to riverine and freshwater wetland systems. Dense growth of seedlings and young trees can alter stream beds and channel flow, resulting in increased bank erosion. Mature trees produce large amounts of wind-dispersed seed annually.

Willows are a declared noxious weed throughout New South Wales.

Priorities for Control

The control of Willows is generally considered to be of low to medium priority in the NTR however a higher priority will be given where:

- They are a small isolated infestation likely to spread into new areas;
- There is evidence of a detrimental impact on stream banks; and
- They impact on the conservation and/or recreational values of a reserve.

Control

Physical removal and herbicide application are the preferred method to control willows:

- Trees less than 0.5 metre tall can usually be pulled out by hand;
- Machinery can be used to remove larger mature willows but is rarely justifiable and can cause damage to the stream bank;
- Chemical application methods such as foliar spraying for trees up to 2 metres high, stem injection or cut stump for larger trees have been used successfully to control willows.

Monitoring

Monitoring will be limited to field observations to detect changes to the distribution or density of willows on the reserves.

Emerging Pest Species

BELL MINER ASSOCIATED DIEBACK

Distribution and abundance

Bell Miner Associated Dieback (BMAD) is found in a number of eucalypt forest types between Victoria and southern Queensland. The current spatial distribution of BMAD throughout NSW is not known in detail. Significant areas of forests within NTR are at risk or have already been affected by BMAD. Areas of BMAD are known to occur in Cataract NP, Oxley Wild Rivers NP Nymboida NP, Barool NP, Gibraltar Range NP, Mummel Gulf NP and Cottan-Bimbang NP. It is suspected to be present in a number of other reserves along the eastern fall. There are areas of adjoining State Forest and private forested lands that are vulnerable or affected in the Region.

Impacts

'Forest eucalypt dieback associated with over-abundant bell miners and psyllids' has been determined as a KTP under the TSC Act. The condition is associated with the establishment of bell miner colonies and an over abundance of sap sucking psyllid insects in the forest canopy. The persistence of psyllids in the canopy leads to dieback and eventual death of the affected trees. The impacts of BMAD include loss of biodiversity, economic and recreational values. Forests affected by BMAD can become severely degraded with the loss of a significant proportion of overstorey species and in many cases subsequent invasion of the understorey by weeds, particularly lantana.

Avifauna are known to be affected by the presence of over-abundant bell miners. A number of eucalypt species such as *Eucalyptus dunnii, E. saligna*, *E. grandis, E. siderophloia, E. acmenoides, E. punctata, E. paniculata*, are vulnerable to BMAD. EECs that are affected or potentially threatened by BMAD include Blue Gum High Forest of the Sydney Basin Bioregion, Blue Mountains Shale Cap Forest of the Sydney Basin Bioregion, White Gum Moist Forest of the North Coast Bioregion and Grey Box – Grey Gum Wet Sclerophyll Forest of the North Coast Bioregion. The group of fauna at highest risk of BMAD are the eucalypt dependent arboreal species and large forest owls. Koala, greater-squirrel, yellow-bellied glider and brush-tailed phascogale may all be at risk of decline due to poor forest health.

The risk and danger of tree and limb fall is also an issue in some areas affected by dieback and in some areas the visual and recreational qualities of known tourist sites are threatened by the loss of tree canopy and ecological integrity.

Priorities for control

Control priorities are currently limited to identifying the presence of BMAD and assessing the impact of BMAD at particular sites. Where the impact is significant, or could potentially become significant, site management plans will be prepared. Initial sites include Nymboida NP, Barool NP and Cottan-Bimbang NPs

Control

Control of BMAD is a difficult challenge and in the absence of empirical evidence to confirm the causes. Current operational activities to prevent spread and assist ecosystem recovery include weed control and fire management. The use of fire to manage lantana and manipulate bell miner habitat is the more useful tool available for mitigating BMAD impacts at present. Actions outlined in the Draft Statement of Intent for this KTP will be implemented by NPWS.

Monitoring

Monitoring of the location size of BMAD affected areas, and the outcomes of management actions on ecosystems will continue and will be used to assist with adapting future management. Communities at risk of BMAD and new reports of BMAD will be assessed and mapped. The BMAD Working Group will provide advice and direction for future management.

INDIAN OR COMMON MYNA (*Acridotheres tristis*)

Distribution and Abundance

The Indian or Common Myna (*Acridotheres tristis*) is thought to have been introduced to Australia from SE Asia in the 1860's. Since this introduction the species has spread through natural dispersal and by deliberate introductions from the original release sites of Melbourne and Sydney to most of coastal eastern Australia. In recent years it appears that populations of Indian Mynas have increased and expanded their habitat from areas with close association to human habitation to include open pasture lands and open forest.

Indian Mynas are not widely distributed throughout the Region, but information on their distribution and density in the NTR needs to be collected. A small population of the birds has been recorded in Oxley Wild Rivers NP.

Impacts

The Indian Myna is a very intelligent and aggressive bird that is known to evict native birds; parrots, kookaburras and pee-wee's from their nests, dump out their eggs and chase them away from their nests, and drive them away from the area. In urban habitats they are considered to be a threat to the long term survival of native birds. Indian Mynas are also suspected to contribute to the spread of certain weed species such as Bitou bush.

Priorities for Control

- NPWS to encourage local governments in the Region to undertake control programs to reduce the spread of the birds onto NPWS estate.
- NPWS will support community based control programs.
- Development of effective control techniques to eradicate the Indian Myna population in Oxley Wild Rivers NP.

Control

A trapping system developed by Dr Chris Tidemann at the Australian National University (ANU) is currently being trialled by a number of community groups and local councils along coastal New South Wales. Trapping has been successful in cities such as Canberra in reducing localised populations of Indian Mynas. Trapping may be used in the NTR in the future.

Monitoring

NTR staff will actively record/maintain information on the locations of Indian Myna populations within the Region and enter this information into a database such as Wildlife Atlas.

MEXICAN WATER LILY (*Nymphaea Mexicana)*

Distribution and Abundance

Mexican or Yellow waterlily, native to North America and Mexico, is a hardy perennial aquatic weed with floating leaves that is able to spread easily within catchments. In NTR it occurs in the Gara River, in the vicinity of Gara Dam, upstream of Oxley Wild Rivers NP. Mexican waterlily is gradually moving downstream and has the potential to become established within the park.

Impacts

Once established, Mexican waterlily is extremely difficult to eradicate and eventually may form a large enough mass to block waterways. This would have significant impact on aquatic and other native species as well as aesthetic values of the park.

Priorities for Control

Preventing Mexican waterlily from entering and becoming established in Oxley Wild Rivers NP is of the highest priority

Control

Control at this stage will focus on working cooperatively with New England Weeds Authority to prevent further movement of Mexican waterlily downstream towards Oxley Wild Rivers NP. Currently the only effective control method appears to be physical removal of the weed. Concurrently field staff will be trained to identify this plant.

Monitoring

Regular monitoring of the Gara River from the current known location of Mexican waterlily downstream to the park boundary and beyond will be undertaken by staff in conjunction with New England Weeds Authority.

Plant Pathogens of Significance

PHYTOPHTHORA (*Phytophthora cinnamomi*)

Distribution and Abundance

Phytophthora has been identified in Gibraltar Range NP, Werrikimbe NP, Mummel Gulf NP and Oxley Wild Rivers NP.

Impacts

Phytophthora is a soil-borne pathogen belonging to the water mould group. The pathogen spreads through the movement of spores through water or transmission from infested plant roots. The pathogen can also be distributed by machinery or animals. *Phytophthora* infects a large number of species however they display varying effects - some are killed, damaged or show no apparent symptoms. In excess of 30 threatened or ROTAP species are potentially impacted by the pathogen in the NTR.

Infections of native plants by *Phytophthora cinnamomi* has been listed as a key threatening process in Schedule 3 of the *TSC Act* and dieback caused by the root-rot fungus (*Phytophthora cinnamomi*) as a Key Threatening Process under the *EPBC Act.*

Management Objectives

Prevent the spread of *Phytophthora* from current known locations to non–infected areas.

Control Priorities

Implementation of a containment strategy for the NTR will increase public awareness and understanding, and reduce public access to infected catchments. Washing down of all NPWS vehicles is the standard operating procedure for vehicles entering/exiting areas of known *Phytophthora*.

Control Techniques

- Containment through the use of quarantine areas, signage and hygiene facilities
- Protection of key areas through signage and hygiene facilities prior to entry
- Possible treatment of key individual plants

Monitoring

- Soil sampling in areas adjoining containment boundaries to monitor any movement.
- Monitoring of vegetation to in key locations to determine impacts on vegetation and key species.

AMPHIBIAN CHYTRID FUNGUS – *Batrachochytrium dendrobatidis*

Distribution and abundance

Chytridiomycosisis an infectious disease caused by the amphibian chytrid fungus or *Batrachochytrium dendrobatidis* (Longcore et.al. 1999). Believed to have evolved in Africa, the earliest recorded case of amphibian chytrid fungus infection was in South Africa in 1938 (Weldon et.al. 2004). Evidence indicates the fungus was introduced into Australia in the late 1970s and has since spread to four major geographic areas including a large east coast zone from northern Queensland to Victoria (DEH 2006b). The majority of reported chytridiomycosis cases in this zone have been between the Great Dividing Range and the coast with high altitude populations appearing to be more severely affected (Speare 2001).

Impacts

The disease affects amphibians worldwide and has been identified as a major cause of the decline and extinction of species (Skerratt et.al. 2007). It has caused the extinction of one species of Australian frog and has been implicated in the extinction of three others. Some 20 species in NSW have been found to be infected, almost a quarter of the total number of species in the State. Of these 13 are listed as threatened under the EP&BC Act and 15 are listed as threatened under the TSC Act. Chytridiomycosis also has the potential to cause a number of NSW frog species which are currently not listed as threatened to become threatened (DEH 2006b).

As no methods are yet available to treat amphibian populations in the field, susceptible populations may persist only where conditions are not favourable for disease outbreaks (Bosch et al 2007; Walker et al 2010 in Mahony 2010) or when they can evolve an evolutionary response to the threat imposed by the emergence of chytridiomycosis (Mahony 2010).

Management Objectives

- Prevent the further spread of the pathogen into other uninfected areas and frog populations in NSW
- Prevent other species from becoming threatened
- Improve understanding of the disease through monitoring key threatened frog populations

Control Priorities

- Containment
- Manage the threat of chytridiomycosis posed to threatened species and populations of frogs at key locations
- Undertake research and monitoring of the pathogen to further investigate effective management approaches

Control Techniques

- Promote and implement effective hygiene protocols – copy available at: http://www.environment.nsw.gov.au/resources/nature/hyprfrog.pdf
- Threat abatement for key threatened species or populations including habitat modification, captive breeding programs, translocations and treatment of individuals.

Monitoring

- Monitoring key threatened frog populations to investigate transmission and dispersal of *B. dendrobatidis* to improve understanding of the disease
- Support research into understanding species resistance to *B. dendrobatidis*, both innate and acquired to assess evolutionary responses and potentially improve the success of re-introduction programs.

Information extracted from the NSW *Statement of Intent 2: Infection of frogs by amphibian chytrid causing the disease chytridiomycosis*
http://www.environment.nsw.gov.au/resources/threatenedspecies/09479soi2chytrid.pdf

8. Pest distribution tables

The following pest distribution tables give an overview of significant pest species for each reserve within the Region. The data derived from a combination of systematic surveys, consultation with staff and other agencies and through planning processes. The tables are not comprehensive lists of all pest species within the Region.

Pest (Animal) Distribution

Distribution of Pest Animal Species in Tenterfield NPWS Area

● Denotes established widespread populations throughout a reserve

○ Denotes scattered populations throughout a reserve

⊙ Denotes isolated populations restricted to a small geographic area of a reserve

Table 1. Distribution of Pest Animal Species in Tenterfield NPWS Area.

Reserve	Deer	Feral Cats	Feral Cattle	Feral Goats	Feral Horses	Feral Pigs	Foxes	Rabbits	Wild Dogs
Arakoola NR		○		○		●	●	○	○
Bald Rock NP	○	○				●	○	○	●
Basket Swamp NP		○				●	○		●
Bluff River NR		○		○		●	○	○	●
Bolivia Hill NR		○		○		●	●	○	●
Boonoo Boonoo NP		○				●	○	○	●
Burral Yurral CCA NP & NR		○		●		●	●		
Capoompeta NP	●	○				●	○	○	●
Cataract NR		○	○				○		●
Crooked Creek CCA NP		○					○		
Currys Gap SCA		○				○	●	○	○
Demon NR		○				○	○	○	○
Doctors Nose NR		○					●	○	
Donnybrook NP	○	○		○		●	○		○
Dthinna Dthinnawan CCA NP & NR		○		●		●	●	○	○
Gibraltar NR		○		●		○	○	○	○
Kwiambal NP & CCA NP	○	○		●		●	○	○	○
Maroomba SCA		○				○	○		
Mount Mackenzie NR		○				○	●	○	○
Severn River NR	○	○		●		○	○	○	○
Taringa NR		○		●		●	●	○	○
Timbarra NP		○					○		●
Torrington SCA	○	○	○	○		●	●	○	●
Washpool NP & SCA (west)	○	○	○			●	○	○	●

Distribution of Pest Animal Species in Glen Innes NPWS Area

● Denotes established widespread populations throughout a reserve

○ Denotes scattered populations throughout a reserve

⊙ Denotes isolated populations restricted to a small geographic area of a reserve

Table 2. Distribution of Pest Animal Species in Glen Innes NPWS Area

Reserve	Deer	Feral Cats	Feral Cattle	Feral Goats	Feral Horses	Feral Pigs	Foxes	Rabbits	Wild Dogs
Baramayal CCA NP		○					●	○	
Barool NP	○	○					○		●
Burnt Down Scrub NR		○					○		●
Butterleaf NP & SCA	○	○		○		●	●		●
Fladbury NR	○	○				○	●	○	
Gibraltar Range NP		●	○				○		●
Goonoowigal CCA SCA		○		○		○	●	○	
Guy Fawkes River NP	○	○		○	●	●	○	○	●
Kings Plains NP	●	○		○		●	●	○	○
Little Llangothlin NR		○					●	○	
Mann River NR	○	○		○		○	○		●
Nullamanna CCA NP		○		○		●	○	○	○
Nymboida NP & SCA		○					○		●
Tingha Plateau CCA SCA		○				○	●	○	
Warra NP	○	○				●	●	○	●
Washpool NP & SCA (north)		●	○				○		●

Distribution of Pest Animal Species in Armidale NPWS Area

● Denotes established widespread populations throughout a reserve

○ Denotes scattered populations throughout a reserve

⊙ Denotes isolated populations restricted to a small geographic area of a reserve

Table 3. Distribution of Pest Animal Species in Armidale NPWS Area.

Reserve	Deer	Feral Cats	Feral Goats	Feral Horses	Feral Pigs	Foxes	Rabbits	Wild Dogs
Avondale SCA		○			○	○	○	○
Bingara CCA SCA		○	○		○	○	○	
Booroolong NR	○	○			●	○	○	
Cunnawarra NP	⊙	○			○	○		○
Duval NR		○				○	○	
Georges Creek NR		○				○		●
Gwydir River CCA NP & SCA	●	○	●		●	○	○	
Hobden Hill CCA NP		○	○		○	○	○	
Horton Falls CCA NP		○	●			○		
Imbota NR		○				○	○	
Indwarra NR		○	●		⊙	○	○	
Ironbark NR	○	○	●		○	○	⊙	
Linton NR		○			⊙	○	○	
Mother of Ducks Lagoon NR		○				○	⊙	
Mount Yarrowyck NR		○	●		●	●	○	
Oxley Wild Rivers NP & SCA	⊙	○	⊙	○	●	●	⊙	●
Serpentine Ridge CCA NP		○	○		○	○	○	⊙
Single NP		○	⊙		⊙	○	○	
Stonewoman AA								
Stony Batter Creek NR		○			○	○	○	
The Basin NR	○	○	●		○	●	○	
Warialda CCA NP & SCA		○	○		○	○		
Warrabah NP		○	●		●	○	○	
Watsons Creek NP		○			○	○	○	
Watsons Creek NR & SCA		○	○		●	○	⊙	⊙
Woodsreef CCA SCA		○	○		○	○		
Yina NR		○				○	○	

Distribution of Pest Animal Species in Walcha NPWS Area

● Denotes established widespread populations throughout a reserve

○ Denotes scattered populations throughout a reserve

⊙ Denotes isolated populations restricted to a small geographic area of a reserve

Table 4. Distribution of Pest Animal Species in Walcha NPWS Area.

Reserve	Deer	Feral Cats	Feral Goats	Feral Horses	Feral Pigs	Foxes	Rabbits	Wild Dogs
Aberbaldie NR		○			⊙	●	⊙	
Carrai NP SCA & AA		○			○	○		○
Cottan-Bimbang NP & SCA	⊙	○			○	○		●
Melville Range NR		○	○		○	●	○	
Mummel Gulf NP & SCA		○			●	●	○	●
Ngulin NR	○	○			●	●	○	●
Nowendoc NP	○	○	⊙	●	●	●	⊙	●
Oxley Wild Rivers NP & SCA	○	○	○	●	●	●	⊙	●
Tuggolo Creek NR	○	○			○	●		●
Werrikimbe NP & SCA	⊙	○			●	●	○	●

Pest (Weed) Distribution

Distribution of Pest Weed Species in Tenterfield NPWS Area

● Denotes established widespread populations throughout a reserve

○ Denotes scattered populations throughout a reserve

⊙ Denotes isolated populations restricted to a small geographic area of a reserve

Table 5. Distribution of Pest Weed Species in Tenterfield NPWS Area.

Reserve	African Love Grass	Blackberry	Cats Claw Creeper	Coolatai Grass	Crofton Weed	Giant Parramatta Grass	Honey Locust	Lantana	Mother of Millions	Mysore Thorn	Nodding Thistle	Osage Orange	Prickly Pear spp	Privet	Tree of Heaven	Whisky Grass	Xanthium spp
Arakoola NR				●								●	○		●		○
Bald Rock NP	○	○		○												●	
Basket Swamp NP	○	○														○	
Bluff River NR	○	○											○				○
Bolivia Hill NR	●	○		●												●	
Boonoo Boonoo NP	○	○		○		●										●	
Burral Yurral CCA NP & NR				○									○				
Capoompeta NP	○																
Cataract NR			●	○	○	●		●									
Crooked Creek CCA NP																	
Currys Gap SCA	●	○		○									○	●			
Demon NR		○		○		○		○					○				
Doctors Nose NR																	
Donnybrook NP				○													
Dthinna Dthinnawan CCA NP & NR				●		○			●				○			○	
Gibraltar NR				○									○				
Kwiambal NP & CCA NP				●			●		●			●	●		●		○
Maroomba SCA				○													
Mount Mackenzie NR	○																
Severn River NR	○			○			●					●	○		●	○	○
Taringa NR				○									○				
Timbarra NP				○		●		●							○	○	
Torrington SCA		○											○		○		
Washpool NP & SCA (west)	●	○			○	○		○								●	

Distribution of Pest Weed Species in Glen Innes NPWS Area

● Denotes established widespread populations throughout a reserve

○ Denotes scattered populations throughout a reserve

⊙ Denotes isolated populations restricted to a small geographic area of a reserve

Table 6. Distribution of Pest Weed Species in Glen Innes NPWS Area.

Reserve	African Love Grass	Blackberry	Cats Claw Creeper	Coolatai Grass	Crofton Weed	Giant Parramatta Grass	Honey Locust	Lantana	Mother of Millions	Mysore Thorn	Nodding Thistle	Osage Orange	Prickly Pear spp	Privet	Tree of Heaven	Whisky Grass	Xanthium spp
Barayamal CCA NP	○	●		●								○	○	●	●		○
Barool NP	●	●		●	●	●	●	●								●	
Burnt Down Scrub NP				●	●			●									
Butterleaf NP & SCA	○															○	
Fladbury NR	○																
Gibraltar Range NP	●				●	●		●								●	
Goonoowigal CCA SCA		●	○	●					○				○	○	●		
Guy Fawkes River NP	●	●		●		●		●					○				○
Kings Plains NP		●		●									○	●		●	○
Little Llangothlin NR		●									●						
Mann River NR	●	○		●		●											○
Nullamanna CCA NP				○									○				
Nymboida NP & SCA	●	●		●	●	●	●	●								●	○
Tingha Plateau CCA SCA																	
Warra NP		○															○
Washpool NP & SCA (north)	●	○		●	●	●		●								●	

Distribution of Pest Weed Species in Armidale NPWS Area

● Denotes established widespread populations throughout a reserve

○ Denotes scattered populations throughout a reserve

⊙ Denotes isolated populations restricted to a small geographic area of a reserve

Table 7. Distribution of Pest Weed Species in Armidale NPWS Area.

Reserve	Blackberry	Blue Heliotrope	Box Thorn	Coolatai Grass	Giant Parramatta Grass	Lantana	Mother of Millions	Nodding Thistle	Prickly Pear spp.	Salix spp.	Serrated Tussock	St. John's Wort	Tree of Heaven	Tropical Soda Apple	Xanthium spp.
Avondale SCA	⊙														
Bingara CCA SCA	○	⊙	○	○			⊙		○			⊙			○
Booroolong NR	●							⊙							○
Cunnawarra NP															⊙
Duval NR	⊙														
Georges Creek NR	⊙	⊙		⊙	○	●								⊙	○
Gwydir River CCA NP & SCA	○	⊙	○	○					●	○			○		○
Hobden Hill CCA NP			⊙	⊙					○			⊙			⊙
Horton Falls CCA NP															
Imbota NR	⊙										⊙				
Indwarra NR	⊙														
Ironbark NR	○			○					○	○					○
Linton NR	⊙			●					○						○
Mother of Ducks Lagoon NR	○							○		○		○			○
Mount Yarrowyck NR	○			●					○						
Oxley Wild Rivers NP & SCA	●	○			⊙	●			●	⊙			⊙	⊙	○
Serpentine Ridge CCA NR			⊙	⊙					⊙			⊙			⊙
Single NP	⊙			⊙					⊙						○
Stonewoman AA				○											
Stony Batter Creek NR	⊙														
The Basin NR	○								○	○					○
Warialda CCA NP & SCA		○	○	○					●						
Warrabah NP	○	○		⊙					○	●					●
Watsons Creek NP	⊙			⊙					○			⊙			⊙
Watsons Creek NR & SCA	⊙								○						
Woods Reef CCA SCA			⊙	⊙					○			⊙			⊙
Yina NR	⊙										⊙				

Distribution of Pest Weed Species in Walcha NPWS Area.

● Denotes established widespread populations throughout a reserve

○ Denotes scattered populations throughout a reserve

⊙ Denotes isolated populations restricted to a small geographic area of a reserve

Table 8. Distribution of Pest Weed Species in Walcha NPWS Area.

Reserve	Blackberry	Blue Heliotrope	Coolatai Grass	Crofton Weed	Giant Parramatta Grass	Lantana	Nodding Thistle	Prickly Pear spp.	Salix spp.	Serrated Tussock	St. John's Wort	Tree of Heaven	Wild Tobacco	Xanthium spp.
Aberbaldie NR	⊙													
Carrai NP SCA and AA	○				○	○								
Cottan-Bimbang NP & SCA	⊙		⊙	⊙										
Melville Range NR			⊙					⊙			⊙	⊙		
Mummel Gulf NP & SCA	○		⊙	⊙			⊙				⊙			
Ngulin NR	○						○							
Nowendoc NP	○			⊙		⊙	⊙		⊙		⊙	⊙	⊙	
Oxley Wild Rivers NP & SCA	●	○	⊙	⊙	⊙	●		○	○		⊙	○	○	○
Tuggolo Creek NR	⊙						⊙							
Werrikimbe NP & SCA	●					○			○					

9. Appendix

Identified Key Threatening Processes in NTR

The Region is very biodiverse and contains many threatened species and endangered ecological communities. There are many threats to these species and communities some of which have been identified at the Federal and State level as 'Key Threatening Processes'. The processes currently evident in the NTR are listed below.

Key Threatening Process	Type	State	National
Invasion and establishment of exotic vines and scramblers	Weed	●	
Invasion of native plant communities by exotic perennial grasses	Weed	●	
Invasion, establishment and spread of *Lantana camara*	Weed	●	
Competition and grazing by the European rabbit	Pest animal	●	●
Competition and habitat degradation by feral goats (*Capra hircus*)	Pest animal	●	●
Competition from feral honeybees	Pest animal	●	
Herbivory and environmental degradation caused by feral deer	Pest animal	●	
Introduction of the large earth bumblebee (*Bombus terrestris*)	Pest animal	●	
Predation by feral cats	Pest animal	●	●
Predation by the European Red Fox	Pest animal	●	●
Predation, habitat degradation, competition and disease transmission by Feral Pigs (*Sus scrofa*)	Pest animal	●	●
Alteration to the natural flow regimes of rivers, streams, floodplains & wetlands.	Habitat loss/change	●	
Bush rock Removal	Habitat loss/change	●	
Clearing of native vegetation	Habitat loss/change	●	●
Alteration of habitat following subsidence due to long wall mining	Habitat loss/change	●	
Ecological consequences of high frequency fires	Habitat loss/change	●	
Human-caused Climate Change	Habitat loss/change	●	●
Loss and/or degradation of sites used for hill-topping by butterflies	Habitat loss/change	●	
Removal of dead wood and dead trees	Habitat loss/change	●	
Infection of frogs by amphibian chytrid fungus causing the disease *chytridiomycosis*	Disease	●	●
Infection of native plants by *Phytophthora cinnamomi*	Disease	●	●