Office of Environment & Heritage
NSW National Parks & Wildlife Service

Hunter Region

Draft Regional Pest Management Strategy

Part B: 2012-2015

This plan should be cited as follows:

Office of Environment and Heritage. (2011). Draft Hunter Regional Pest Management Strategy Part B: 2012-2015. OEH, Sydney, NSW

For further information contact:
Regional Operations Coordinator
Hunter Region
Coastal Branch
National Parks and Wildlife Service
Office of Environment and Heritage
Department of Premier and Cabinet
12B Teramby Road
Nelson Bay
2317 NSW
Telephone: 02 4984 8200

The New South Wales National Parks and Wildlife Service (NPWS) is part of the Office of Environment and Heritage (OEH). Throughout this strategy, references to NPWS should be taken to mean the NPWS carrying out functions on behalf of the Director General of the Department of Premier and Cabinet, and the Minister for the Environment.

Published by:
Office of Environment and Heritage
59–61 Goulburn Street, Sydney, NSW 2000
PO Box A290, Sydney South, NSW 1232

Report pollution and environmental incidents
Environment Line: 131 555 (NSW only) or info@environment.nsw.gov.au
See also www.environment.nsw.gov.au/pollution

Phone: (02) 9995 5000 (switchboard)
Phone: 131 555 (environment information and publications requests)
Phone: 1300 361 967 (national parks, climate change and energy efficiency information and publications requests)
Fax: (02) 9995 5999
TTY: (02) 9211 4723
Email: info@environment.nsw.gov.au
Website: www.environment.nsw.gov.au

ISBN 978 1 74293 404 4
OEH 2011/0892
December 2011

Contents

Summary iv

Acronyms v

1. Introduction 1

2. Regional overview 1

3. Hunter Region - Area Maps 4

4. Regional prioritisation 9

5. Table of prioritised regional pest programs 11

6. Consultation 31

7. Pest species overviews 32

8. Pest distribution tables 71

8.1 Vertebrate Pest Distribution 71

8.2 Weed Distribution 74

9. References 79

10. Appendices 81

Appendix 1 – Declared Weeds 81

Appendix 2 – Schedule 2 Lands 84

Summary

Pests are among the greatest threats to biodiversity throughout Australia. In NSW they have been identified as a major threat to over 65% of the species, populations and communities listed under the *Threatened Species Conservation Act 1995*. Therefore, minimising the impacts pests species have on biodiversity and also on neighbouring land holders are two of the main objectives in the NSW National Parks and Wildlife Service Hunter Region (NPWS Hunter Region).

NPWS Hunter Region currently manages some 268 900 hectares of land within the Hunter, Peel and Manning Valleys. The region extends from Stockton in the south to Harrington in the north and extends inland to west of Quirindi.

NPWS Hunter Region is a major stakeholder in a wide range of successful pest programs. Working cooperatively with landholders, land management agencies and other stakeholders and applying a landscape approach to managing pest species has proven to be essential in gaining effective results. Examples of successful programs include:

Vertebrate Pest Program on Broughton Island

During 2009, Broughton Island (part of Myall Lakes National Park) was aerially baited as part of a rabbit, black rat and house mouse eradication program. Removal of these species was required in order to promote rehabilitation of island vegetation and protect colonies of nesting seabirds. This program proved to be highly successful and Broughton Island has been declared “rodent-free”. Monitoring transects have been established since the eradication to evaluate the rehabilitation of the islands vegetation.

Bitou Bush Control

Ongoing control of bitou bush included significant aerial spraying of coastal reserves across the region, particularly the coastline in Great Lakes Area. In the past 12 months, approximately 50 kilometres of coastline was treated between Stockton and Harrington.

Fox TAP Program

The implementation of the NSW Fox Threat Abatement Plan (TAP) has led to control programs to protect populations of the endangered broad-toothed rat in Barrington Tops NP, the brush-tailed rock wallaby in Woko and Curracabundi NPs and endangered shorebirds in the Manning estuary. At each site annual population monitoring of the species at risk has shown the success of the program.

Rainforest Restoration Programs

Long term rainforest restoration programs in the Manning valley have been aimed at protecting the remaining subtropical lowland rainforest in the Manning Valley. Wingham Brush, Lansdowne and Coocumbac Island nature reserves protect 90% of this endangered ecological community and weed control within these reserves has been successful in protecting the biodiversity of these sites.

This strategy has been developed to provide NPWS, the community, stakeholders and other agencies with our strategic direction in pest management across the Hunter Region.

Acronyms

The following acronyms are used throughout this document.

Acronym	Expanded Text
1080	Sodium monofluoroacetate
BMAD	Bell Miner Associated Dieback
BPWW	Biodiversity Priorities for Widespread Weeds
CL	Conservation Lands
EEC	Endangered Ecological Community
LGA	Local Government Area
KTP	Key Threatening Process under the *TSC Act*
LHPA	Livestock Health and Pest Authority
National Park	National Park
Nature Reserve	Nature Reserve
NPWS	NSW National Parks and Wildlife Service
OEH	Office of Environment and Heritage
PAS	Priorities Action Statement
Ramsar	The Convention on Wetlands of International Importance, called the Ramsar Convention, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources
ROTAP	Rare or Threatened Australian Plants
State Conservation Area	State Conservation Area
TAP	Threat Abatement Plan
TSC Act	*Threatened Species Conservation Act 1995*
WONS	Weed of National Significance

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 Hunter Region Regional 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 the NSW National parks and Wildlife Service (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 Hunter Region of NSW National Parks and Wildlife Service currently covers parts of the Hunter, Peel and Manning Valleys. The region extends from Stockton in the south to Harrington in the north and extends inland to west of Quirindi.

The region is divided into five management areas - Barrington Tops, Hunter Coast, Great Lakes, Manning and Upper Hunter. Hunter Region manages 268 900 hectares of reserved land including 27 national parks, 13 state conservation areas, 60 nature reserves and one regional park (Figures 1 to 5).

The Hunter region was one of the first areas in NSW cleared for agricultural purposes, thus a wide range of plants and animals have been introduced. There is an altitudinal range from the coast to sub-alpine and back down the western slopes, and the variation in landuse including rural, semi-rural, urban and natural areas, all contribute to a wide variety of pest management issues.

Reserves in the Hunter Region protect a number of Endangered Ecological Communities (EECs) including Freshwater Wetlands on Coastal Floodplains, Box-Gum Woodland, Hunter Valley Vine Thickets, Littoral Rainforest, Lower Hunter Spotted gum Ironbark, Lowland Rainforest on Floodplain, Montane Peatlands and Swamps, Sub-tropical Coastal Floodplain Forest, Swamp Oak Floodplain Forest, Swamp Sclerophyll Forest and *Themeda* Grassland on Seacliffs and Coastal Headlands.

Threatened fauna in the region include Broad-toothed Rat (*Mastacomys fuscus*), Brush-tailed Rock-wallaby (*Petrogale penicillata*), Beach Stone-curlew (*Esacus neglectus*), Bush Stone-curlew (*Burhinus grallarius*), Gould's Petrel (*Pterodroma leucoptera leucoptera*), Grey-headed Flying Fox (*Pteropus alecto*), Little Tern (*Sterna albifrons*) and Pied Oystercatcher (*Haematopus longirostris*).

Threatened flora include *Allocasuarina defungens, A. simulans, Asperula asthenes, Chamaesyce psammogeton, Cynanchum elegans, Diuris arenaria, D. flavescens, D. praecox, D. venosa, Eucalyptus parramattensis* ssp. *decadens. Grevillea obtusiflora, Melaleuca groveana, Plectranthus cremnus, Pultenaea maritima, Senecio spathulatus*, *Senna acclinis, Syzygium paniculatum*, *Tetratheca juncea* and *Thesium australe.*

The feral animal threats addressed in this strategy are Wild Dog (*Canis lupus familiaris*), European Red Fox (*Vulpes vulpes*), Feral Pig (*Sus scrofa*), European Rabbit *(Oryctolagus cuniculus),* Feral Horse (*Equus calabus*), Feral Goat (*Capra hircus*), Feral Deer (various species) and Feral Cat (*Felis catus*). While the impacts from some introduced animal species have remained relatively stable, in the past 4-5 years there has been an observable increase in the number of feral deer within a range of locations, particularly in the Upper Hunter Area. Feral horse impacts are also more observable in Barrington Tops National Park and State Conservation Area. Cane toads have been recorded and controlled near Harrington in Manning Area and occasional individuals are reported in the Region. Hunter Region investigates all cane toad reports to ensure that populations do not become established.

Pest issues in the rural areas of the upper Hunter and Manning catchments are associated with impacts from vertebrate pests. Coordinated cooperative programs with neighbours and the Mid-coast, New England, Cumberland and Central North Livestock Health and Pest Authorities are implemented to reduce populations of wild dog, fox and feral pigs in key areas including Barrington Tops, Camerons Gorge, Curracabundi, Ben Halls Gap, Biriwal-Bulga and Towarri National Parks and Tomalla, Back River, Woolooma and Wallabadah Nature Reserves.

The implementation of the NSW Fox Threat Abatement Plan (TAP) has led to control programs to protect populations of the endangered broad-toothed rat in Barrington Tops NP, the brush-tailed rock wallaby in Woko and Curracabundi NPs and endangered shorebirds in the Manning estuary. A component of these programs includes annual population monitoring of the species at risk. An annual wild dog program is coordinated on public lands across the Port Stephens Local Government Area (LGA) to reduce predation on koala populations.

The dominant introduced plant species impacting on the natural environment in Hunter Region include *Ageratina riparia* (Mistflower), *Asparagus* species (Bridal Creeper, Ground and Climbing Asparagus), *Chrysanthemoides monilifera* subspecies *rotundata* (Bitou Bush)*, Cytisus scoparius* (Scotch Broom), *Hypericum perforatum* (St John's Wort), *Lantana camara* (Lantana), *Rubus fruticosus* agg. (Blackberry), *Opuntia* spp. (Prickly, Rope and Tiger Pear) and exotic vines and scramblers (including *Anredera cordifolia* (Madeira Vine)*, Araujia sericifera* (Moth Vine), *Ipomoea* spp*.* (Morning Glory species) and *Macfadyena unguis-cati* (Cat's Claw Creeper)).

There are a number of potentially significant weed threats present in the Hunter Region. Of greatest concern are aquatic weed infestations, particularly *Salvinia molesta* (Salvinia), *Sagittaria platyphyla* (Sagittaria) and *Cabomba* c*aroliniana* (Cabomba) present in the catchment of Myall Lakes. These species threaten the

significant biodiversity values of the Ramsar wetlands of Myall Lakes National Park. Terrestrial weed threats to coastal reserves include *Gloriosa superba* (glory lily) and *Lilium formosanum* (formosan lily). Inland reseves are at risk of infestation by *Hyparrhenia hirta* (Coolatai Grass), *Olea* species (exotic olive species) and *Ulex europaeus* (Gorse).

During 2010/11, Hunter Region undertook more than 60 weed control programs. Techniques used included aerial boom and spot spraying, ground spraying from vehicle-based and backpack units, bush regeneration techniques and management of aquatic weeds, including manual removal and herbicide application.

The Bitou Bush Threat Abatement Plan (DEC2006a), the National Plan to Protect Environmental Assts from Lantana (Biosecurity Queensland 2010) and the Biodiversity Priorities for Widespread Weeds (NSW DPI & OEH 2011) assist the region to prioritise weed control programs, targeting sites to protect threatened species and endangered ecological communities.

Scotch broom containment has been undertaken in Barrington Tops National Park and State Conservation Area for almost 15 years. A 10-year review of the control strategy has recently been completed and indicates the continuation of the annual program to ensure containment.

Over the past 2-3 years, there has been an extensive strategic and co-operative cross-tenure bitou bush control program undertaken in Great Lakes Area, employing aerial and ground-based spraying techniques. This program has controlled widespread primary infestations of bitou bush, reducing the impacts of this weed across the entire coastline. Combined with other bitou bush aerial spraying programs along the Hunter coastline, in 2010/2011 approximately 50 kilometres of primary and follow-up control was undertaken.

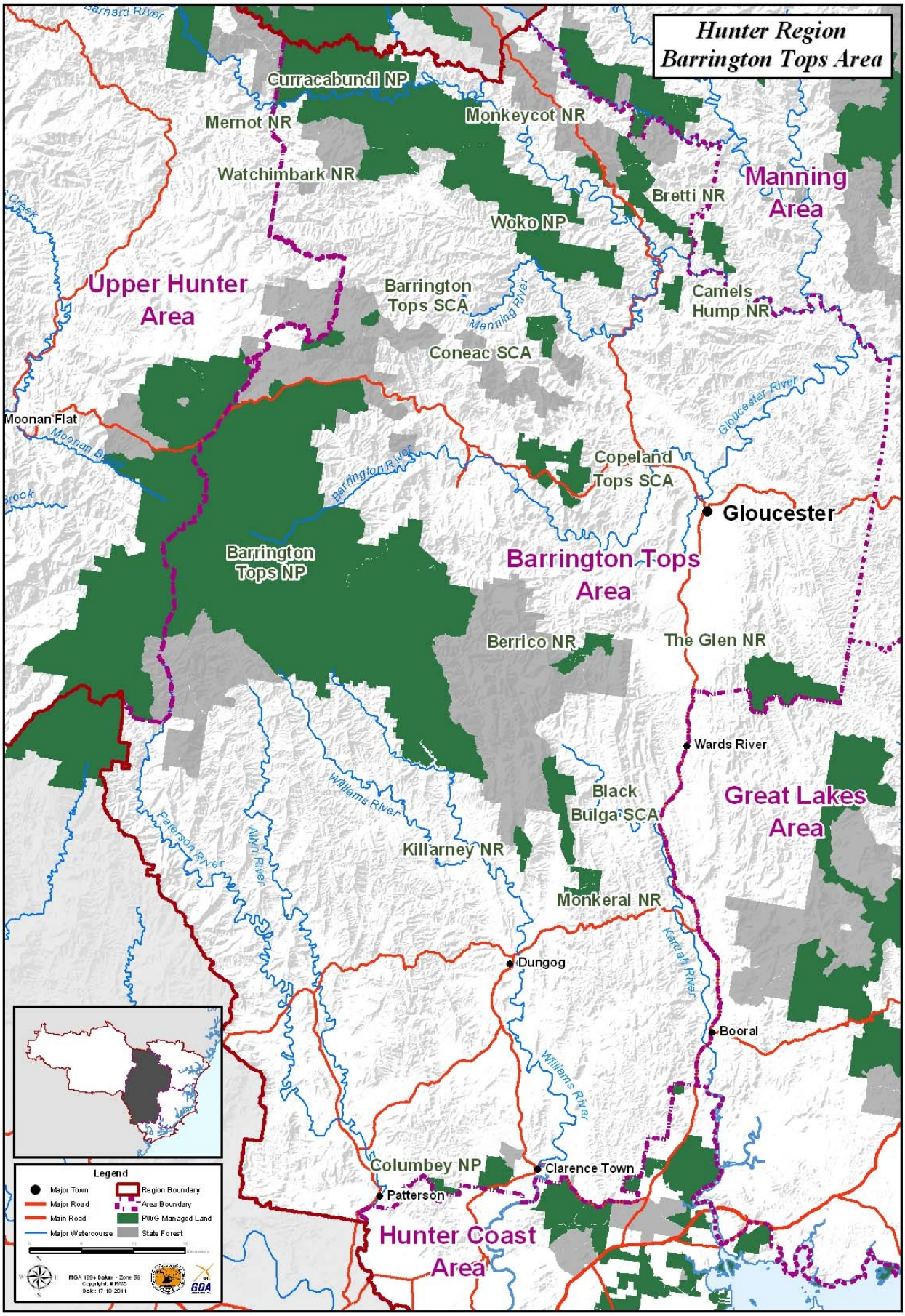
Long term rainforest regeneration programs in Wingham Brush, Lansdowne and Coocumbac Island nature reserves in Manning Area have been aimed at protecting the remaining subtropical lowland rainforest in the Manning Valley. These three nature reserves protect 90% of this endangered ecological community and weed control within these reserves has been successful in protecting the biodiversity of these sites.

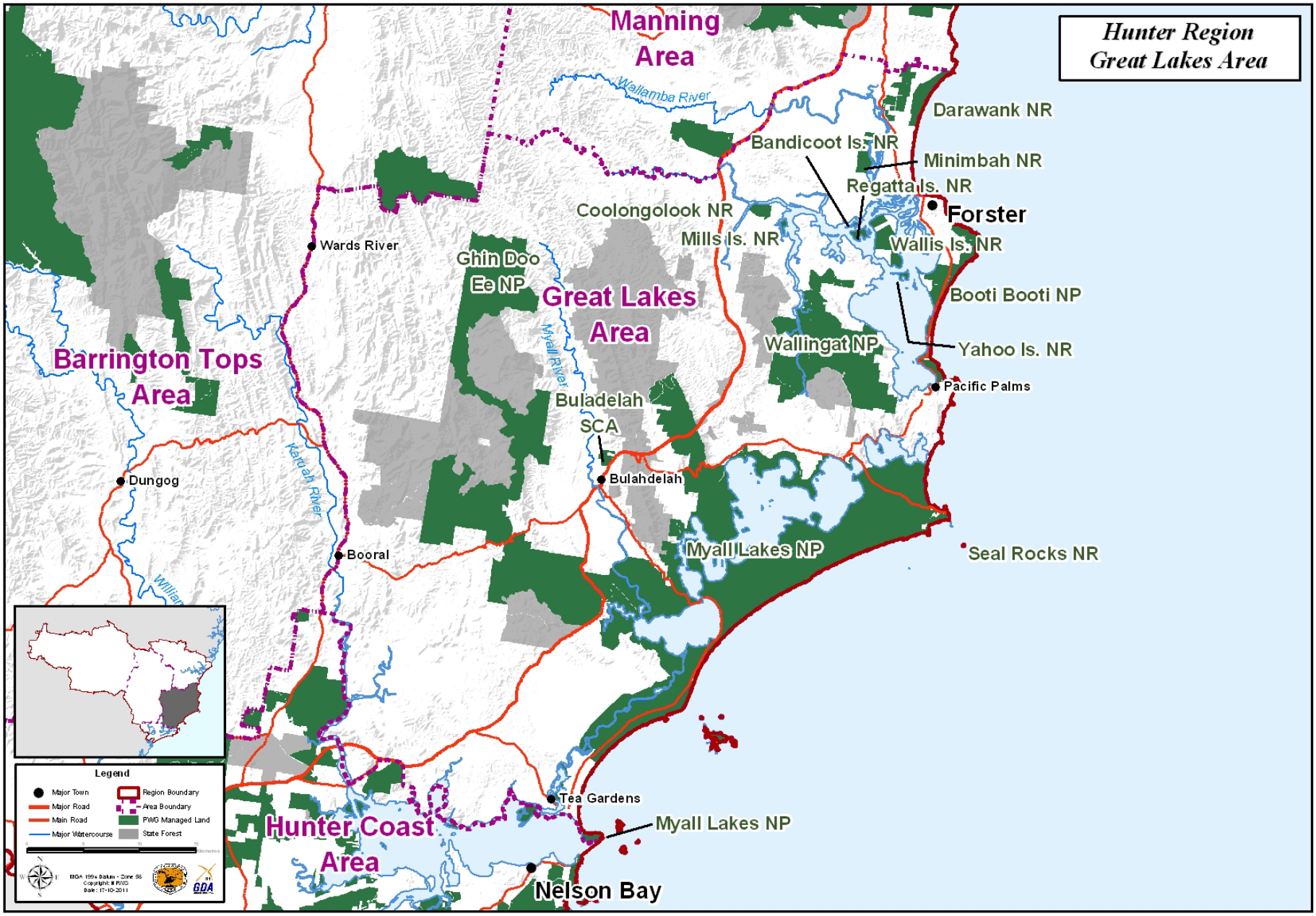
Across the region, biocontrol agents have been released for a number of weed species, including bitou bush, blackberry, mistflower, prickly pear and scotch broom.

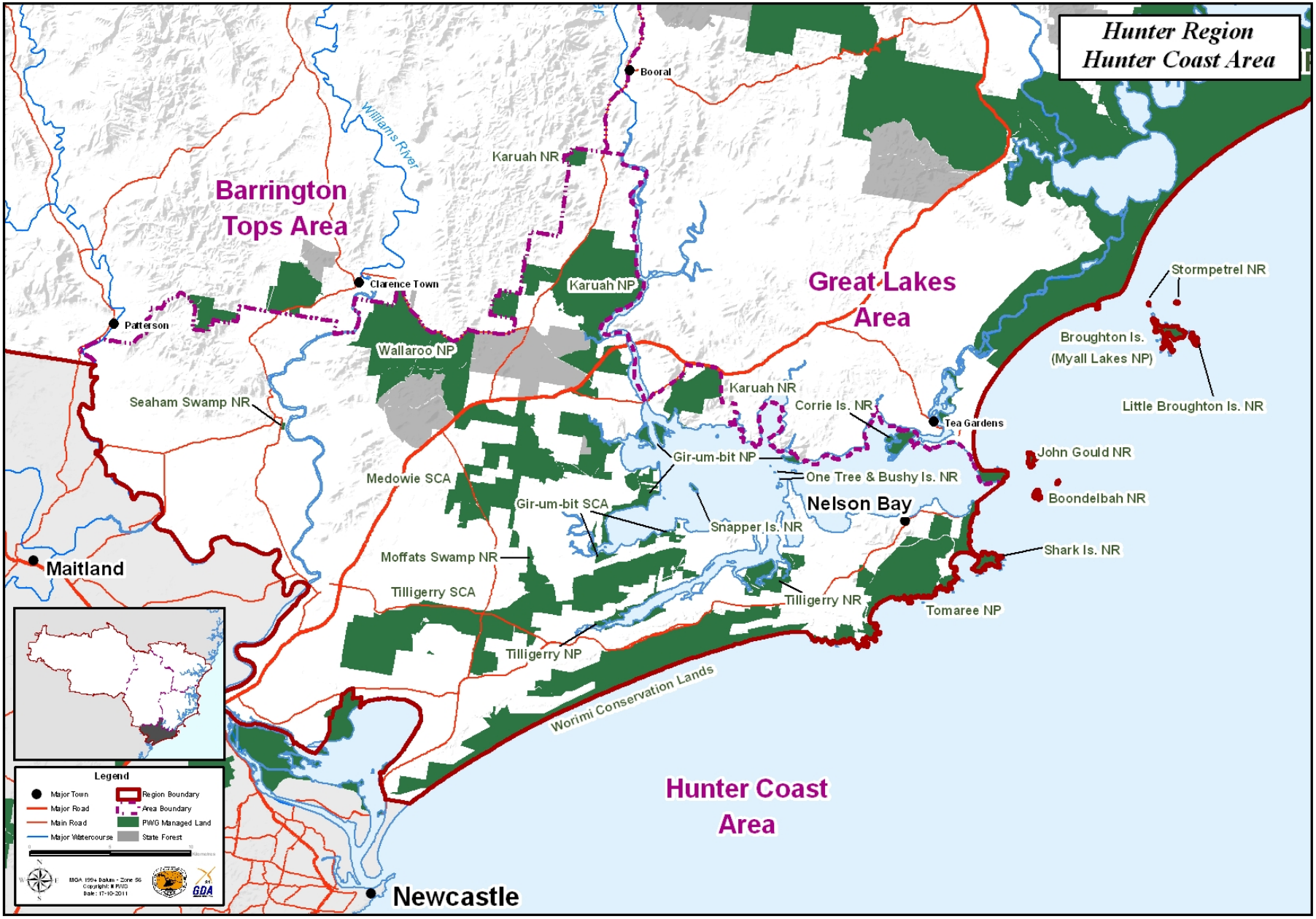
Island recovery weed control programs are undertaken on Snapper Island and John Gould Nature Reserves and Broughton Island in Myall Lakes National Park to protect threatened ecological communities such as Littoral Rainforest and *Themeda* coastal clay grasslands. During 2009 Broughton Island was aerially baited during a rabbit, black rat and house mouse eradication program. This program proved to be highly successful and Broughton Island has been declared “rodent-free”. Monitoring transects have been established since the eradication to evaluate effects of this program on the rehabilitation of the island’s vegetation.

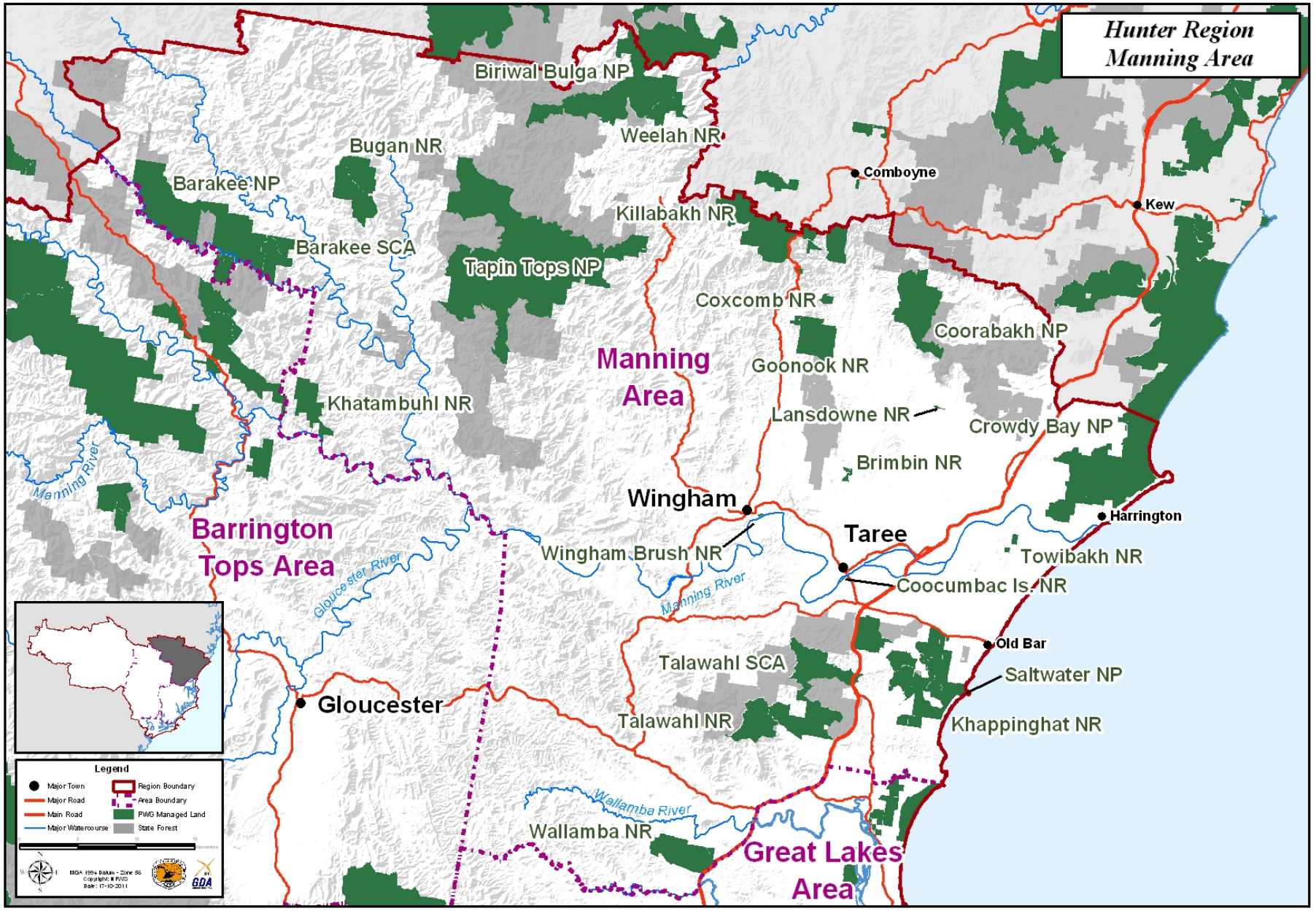
Within Hunter Region, long-term vegetation monitoring plots have been established to measure the response of bitou bush (Tomaree NP) and lantana (Columbey NP) to weed management, as well as the associated native species recovery. A number of research and monitoring programs for scotch broom, Fox TAP projects and wild dogs are also being undertaken in coordination with various universities, other Government agencies and the Weeds and Pest Invasive Animals Cooperative Research Centres.

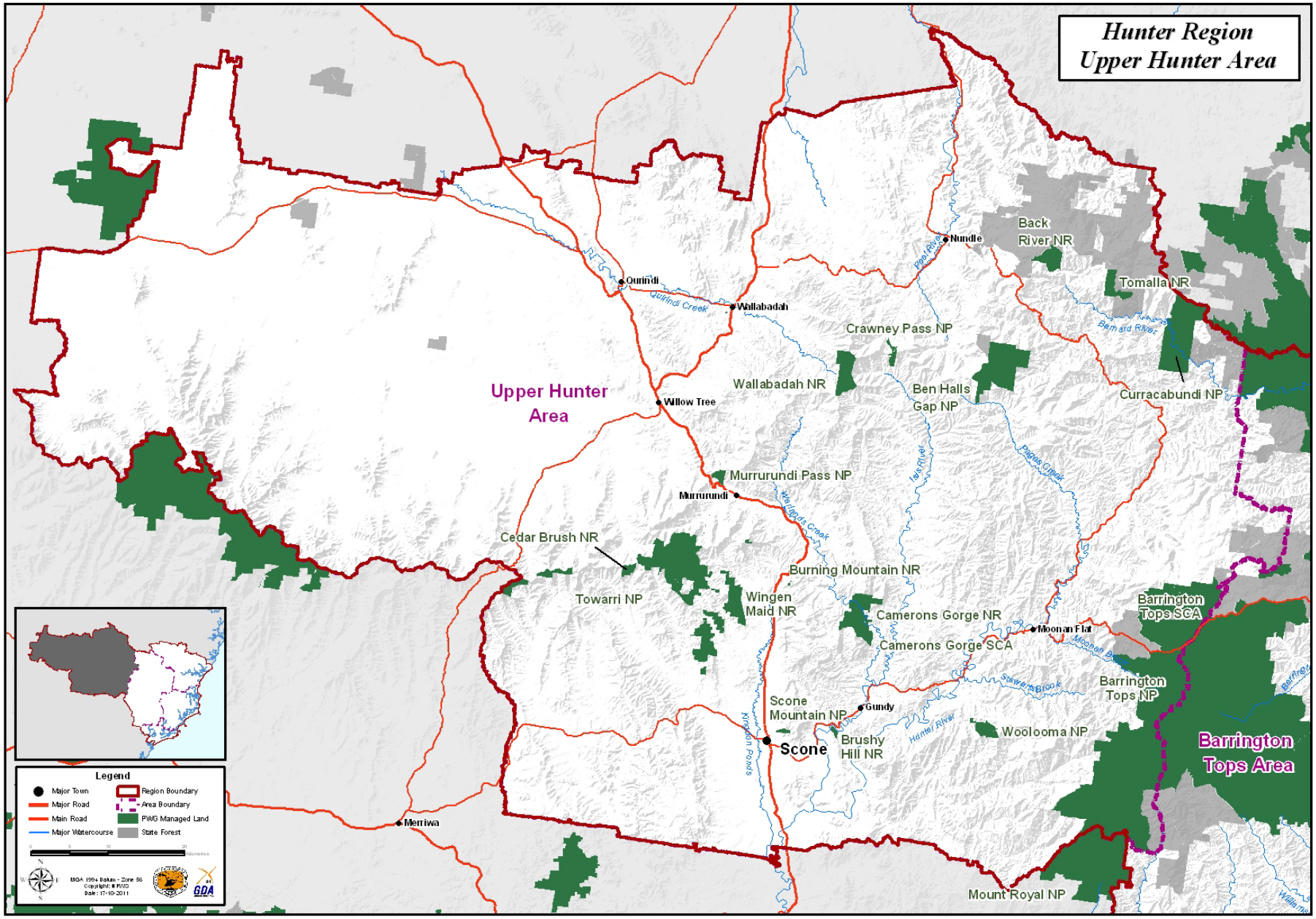
3. Hunter Region - Area Maps




Hunter Region
Great Lakes Area
Manning Area
Wallamba River
Darawank NR
Bandicoot Is. NR
Minimbah NR
Regatta Is. NR
Forster
Coolongolook NR
Mills Is. NR
Wallis Is. NR
Wards River
Ghin Doo Ee NP
Great Lakes Area
Booti Booti NP
Barrington Tops Area
Myall River
Wallingat NP
Yahoo Is. NR
Pacific Palms
Buladelah SCA
Bulahdelah
Dungog
Karuah River
Booral
Myall Lakes NP
Seal Rocks NR
Legend
Major Town
Major Road
Main Road
Major Watercourse
Region Boundary
Area Boundary
PWG Managed Land
State Forest
Tea Gardens
Myall Lakes NP
Hunter Coast Area
Nelson Bay


Hunter Region
Hunter Coast Area
Barrington Tops Area
Great Lakes Area
Hunter Coast Area
Booral
Williams River
Karuah NR
Karuah NP
Clarence Town
Patterson
Wallaroo NP
Seaham Swamp NR
Medowie SCA
Gir-um-bit NP
Gir-um-bit SCA
Karuah NR
Corrie Is. NR
Tea Gardens
One Tree & Bushy Is. NR
Nelson Bay
Snapper Is. NR
Moffats Swamp NR
Maitland
Tilligerry SCA
Tilligerry NR
Tilligerry NP
Tomaree NP
Shark Is. NR
Worimi Conservation Lands
Newcastle
Stormpetrel NR
Broughton Is.
(Myall Lakes NP)
Little Broughton Is. NR
John Gould NR
Boondelbah NR
Legend
Major Town
Major Road
Main Road
Major Watercourse
Region Boundary
Area Boundary
PWG Managed Land
State Forest


Hunter Region
Manning Area
Biriwal Bulga NP
Weelah NR
Bugan NR
Barakee NP
Barakee SCA
Tapin Tops NP
Killabakh NR
Comboyne
Kew
Coxcomb NR
Coorabakh NP
Manning Area
Goonook NR
Khatambuhl NR
Lansdowne NR
Crowdy Bay NP
Brimbin NR
Manning River
Wingham
Harrington
Barrington Tops Area
Taree
Wingham Brush NR
Towibakh NR
Gloucester River
Manning River
Coocumbac Is. NR
Old Bar
Talawahl SCA
Saltwater NP
Gloucester
Talawahl NR
Khappinghat NR
Wallamba River
Wallamba NR
Great Lakes Area
Legend
Major Town
Region Boundary
Major Road
Area Boundary
Main Road
PWG Managed Land
Major Watercourse
State Forest


Hunter Region
Upper Hunter Area
Upper Hunter Area
Quirindi
Wallabadah
Willow Tree
Murrurundi
Merriwa
Scone
Gundy
Nundle
Moonan Flat
Back River NR
Tomalla NR
Crawney Pass NP
Wallabadah NR
Ben Halls Gap NP
Curracabundi NP
Murrurundi Pass NP
Cedar Brush NR
Burning Mountain NR
Towarri NP
Wingen Maid NR
Camerons Gorge NR
Camerons Gorge SCA
Barrington Tops SCA
Barrington Tops NP
Barrington Tops Area
Scone Mountain NP
Brushy Hill NR
Woolooma NP
Mount Royal NP
Quirindi Creek
Pages Creek
Hunter River
Legend
Major Town
Major Road
Main Road
Major Watercourse
Region Boundary
Area Boundary
PWG Managed Land
State Forest

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, Priorities Action Statement (PAS) and Biodiversity Priorities for Widespread Weeds (BPWW). For example, fox control at Barrington Tops priority sites for brush-tailed rock wallaby as identified in the Fox TAP;

C-HD (Health and Disease)

Programs that target pests which impact significantly on human health or are part of a declared national emergency. For example, 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. For example, 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. For example, control of rabbits impacting on World Heritage values of Barrington Tops National Park; pest control in Ramsar wetlands of Myall Lakes National Park;

H-CH (Cultural Heritage)

Programs targeting pests that impact significantly on important cultural heritage values. For example, control of asparagus fern in Saltwater National Park; undertake bitou bush control to reduce impacts on midden sites in the Worimi Conservation Lands;

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. For example, control of scotch broom within the declared wilderness area of Barrington Tops National Park.

M-RA (Recreation and aesthetic values)

Programs that target pests that impact significantly on recreation, landscape or aesthetic values. For example, control of lantana on the margins of camping areas and control of weeds in scenic areas with high public visitation.

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). For example, control of bitou bush 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. For example, 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. For example, the maintenance of areas treated previously for lantana to continue keeping them weed free.

Window of opportunity

In some circumstances, new programs may be introduced, or priority programs extended to target pests where a control ‘window of opportunity’ is identified. For example, 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 biocontrol 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.

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of Control	Action	Priority
Barrington Tops	Barrington Tops National Park	Barrington Plateau	Fox (*Vulpes vulpes*)	Broad-toothed Rat	Asset protection	Biannual baiting	C-TSC
Barrington Tops	Barrington Tops National Park	Barrington Plateau	Horse (*Equus calabus*)	Montane Peatlands and Swamps EEC, Broad-toothed Rat, threatened orchid species on edges of swamps, public safety	Asset protection	Monitor / Strategic program	C-TSC
Barrington Tops	Barrington Tops National Park	Barrington Tops	Feral Pig (*Sus scrofa*)	Montane Peatlands and Swamps EEC, Broad-toothed Rat, threatened orchid species on edges of swamps	Asset protection	Trapping / aerial shooting	C-TSC
Barrington Tops	Barrington Tops National Park/State Conservation Area	Barrington Tops	Wild Dog (*Canis lupus familiaris*)	Neighbouring properties, predation of stock	Asset protection	Strategic program	C-EC
Barrington Tops	Barrington Tops National Park	Barrington Plateau	Rabbit *(Oryctolagus cuniculus)*	Montane Peatlands and Swamps EEC, Broad-toothed Rat, threatened orchid species on edges of swamps	Asset protection	Monitor / Reactive program	H-IH
Barrington Tops	Barrington Tops National Park	Barrington Plateau	Cat (*Felis catus*)	Broad-toothed Rat	Asset protection	Monitor / Reactive program	C-TSC
Barrington Tops	Curracabundi National Park	Barnard River	Fox (*Vulpes vulpes*)	Brush-tailed Rock Wallaby	Asset protection	Biannual baiting	C-TSC
Barrington Tops	Curracabundi National Park	Barnard River	Goat (*Capra hircus*)	Brush-tailed Rock Wallaby	Asset protection	Reactive program	C-TSC
Barrington Tops	Curracabundi National Park	Barnard River	Wild Dog (*Canis lupus familiaris*)	Neighbouring properties, predation of stock	Asset protection	Strategic program	C-EC
Barrington Tops	Curracabundi National Park	Barnard River	Feral Pig (*Sus scrofa*)	Environmental degradation	Asset protection	Trapping / aerial shooting	C-EC
Barrington Tops	Curracabundi National Park	Tuggalo	Horse (*Equus calabus*)	Environmental degradation	Asset protection	Monitor / Strategic program	M-WNH
Barrington Tops	Curracabundi National Park	Barnard River	Rabbit *(Oryctolagus cuniculus)*	Environmental degradation, protect heritage site	Asset protection	Monitor / Reactive program	M-WNH
Barrington Tops	Curracabundi National Park	Barnard River	Deer (various species)	Environmental degradation	Asset protection	Monitor / Reactive program	Window

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of Control	Action	Priority
Barrington Tops	Columbey National Park/State Conservation Area	Columbey National Park	Wild Dog (*Canis lupus familiaris*)	Neighbouring properties, predation of stock	Asset protection	Strategic program	C-EC
Barrington Tops	Copeland Tops State Conservation Area	Copeland Tops State Conservation Area	Wild Dog (*Canis lupus familiaris*)	Neighbouring properties, predation of stock	Asset protection	Strategic program	C-EC
Barrington Tops	The Glen Nature Reserve	The Glen Nature Reserve	Wild Dog (*Canis lupus familiaris*)	Neighbouring properties, predation of stock	Asset protection	Strategic program	C-EC
Barrington Tops	Woko National Park	Woko National Park	Wild Dog (*Canis lupus familiaris*)	Neighbouring properties, predation of stock	Asset protection	Strategic program	C-EC
Barrington Tops	Barrington Tops National Park	Nolans Swamp	*Holcus lanatus* (Yorkshire Fog), *Cytisus scoparius* (Scotch Broom)	Montane Peatlands and Swamps EEC, Broad-toothed Rat, threatened orchid species on edges of swamps	Asset protection	Ground spray / Cut & Paint	C-TSC
Barrington Tops	Barrington Tops National Park	Little Murray Swamp	*Cytisus scoparius* (Scotch Broom)	Montane Peatlands and Swamps EEC, Broad-toothed Rat, threatened orchid species on edges of swamps	Asset protection	Ground spray / Cut & Paint	C-TSC
Barrington Tops	Barrington Tops National Park	Junction Pools	*Cytisus scoparius* (Scotch Broom)	Montane Peatlands and Swamps EEC, Broad-toothed Rat, threatened orchid species on edges of swamps	Asset protection	Ground spray / Cut & Paint	C-TSC
Barrington Tops	Barrington Tops National Park	Edwards Swamp	*Cytisus scoparius* (Scotch Broom)	Montane Peatlands and Swamps EEC, Broad-toothed Rat, threatened orchid species on edges of swamps	Asset protection	Ground spray / Cut & Paint	C-TSC
Barrington Tops	Barrington Tops National Park	Barrington Plateau	*Rubus fruticosus* agg. (Blackberry)	Montane Peatlands and Swamps EEC, Broad-toothed Rat, threatened orchid species on edges of swamps	Asset protection	Ground spray	C-TSC
Barrington Tops	Barrington Tops National Park	Barrington Plateau Roadsides and trails	*Leucanthemum vulgare* (Ox-eye daisy)	Montane Peatlands and Swamps EEC, Broad-toothed Rat, threatened orchid species on edges of swamps	Asset protection	Monitor / Ground spray	C-NE
Barrington Tops	Barrington Tops National Park	Gloucester River	*Phyllostachys aurea* (Bamboo)	Potential to spread downstream Gloucester River Campground	Asset protection	Hand removal / Cut & Paint	M-RA
Barrington Tops	Barrington Tops National Park	Gloucester Tops Roadsides and trails	*Ageratina adenophora* (Crofton Weed), *A. riparia* (Mistflower)	Reduce spread through reserve	Asset protection	Ground spray	L-PP
Barrington Tops	Barrington Tops National Park	William River / Jerusalem Creek Biocontrol Sites	*Ageratina riparia* (Mistflower)	Assist with biocontrol research	Asset protection	Monitor	L-PP
Barrington Tops	Barrington Tops National Park	Mt Allan / Burraga Roadsides and trails	*Ageratina adenophora* (Crofton Weed), *Ageratina riparia* (Mistflower)	Reduce spread through reserve	Asset protection	Ground spray	L-PP
Barrington Tops	Black Bulga State Conservation Area	Head of reserve (north half) Roadsides and trails	*Ageratina riparia* (Mistflower), *Lantana camara*	Sub-tropical Coastal Floodplain Forest EEC, *Senna acclinis*	Asset protection	Ground spray	C-TSC

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of Control	Action	Priority
Barrington Tops	Black Bulga State Conservation Area	Roadsides and trails	*Ageratina adenophora* (Crofton Weed), *Lantana camara*	Sub-tropical Coastal Floodplain Forest EEC, *Senna acclinis*	Asset protection	Ground spray	L-PP
Barrington Tops	Berrico Nature Reserve	Roadsides and trails	*Ageratina adenophora* (Crofton Weed), *Ageratina riparia* (Mistflower), *Lantana camara*	Reduce spread through reserve	Asset protection	Ground spray	L-PP
Barrington Tops	Columbey National Park	Roadsides and trails	*Lantana camara*	Lower Hunter Spotted gum Ironbark EEC	Asset protection	Ground spray	L-PP
Barrington Tops	Copeland Tops State Conservation Area	Hidden Treasure carpark and Bowman cleared area	*Araujia sericifera* (Moth Vine)	*Eucalyptus largeana* (ROTAP), Sydney Blue Gum Forest; reduce spread through the reserve also for aesthetic purpose in the carpark	Asset protection	Hand removal	C-TSC
Barrington Tops	Copeland Tops State Conservation Area	Griffiths/ Christmas Box and Sleepy Hollow trails	*Lantana camara, Ageratina adenophora* (Crofton Weed)	*Eucalyptus largeana* (ROTAP), Sydney Blue Gum Forest; reduce spread through the reserve	Asset protection	Ground spray	L-PP
Barrington Tops	Copeland Tops State Conservation Area	Sleepy Hollow trail and Basin Loop trail	*Anredera cordifolia* (Madeira vine), Potato vine	Reduce spread through the reserve and permit rainforest areas to regenerate	Asset protection	Hand removal	L-PP
Barrington Tops	Curracabundi National Park	Roadsides and trails, creeklines	*Rubus fruticosus* agg. (Blackberry)	*Stipa* grasslands and riparian vegetation	Asset protection	Ground spray	C-EC
Barrington Tops	Curracabundi National Park	Roadsides and trails, creeklines	*Ageratina adenophora* (Crofton Weed), *Ageratina riparia* (Mistflower)	*Stipa* grasslands and riparian vegetation	Asset protection	Ground spray	C-NE
Barrington Tops	Curracabundi National Park	Karamea and Monkeycot Homestead sites	*Asparagus plumosus* (Climbing Asparagus)	Cultural Heritage sites	Asset protection	Cut & Paint	H-CH
Barrington Tops	Curracabundi National Park	Roadsides and trails, creeklines	*Lantana camara*	*Stipa* grasslands and riparian vegetation	Asset protection	Ground spray	H-CH
Barrington Tops	Curracabundi National Park	Roadsides and trails	Bushland weeds	*Stipa* grasslands and riparian vegetation	Asset protection	Ground spray	M-WNH
Barrington Tops	Curracabundi National Park	Barnard River	Rabbit *(Oryctolagus cuniculus)*	Environmental degradation, protect heritage site	Asset protection	Monitor / Reactive program	M-WNH
Barrington Tops	Curracabundi National Park	Open grasslands east of Bluff Mountain	*Hypericum perforatum* (St John's Wort)	*Stipa* grasslands and riparian vegetation	Asset protection	Map / ground spray	C-NE
Barrington Tops	The Glen Nature Reserve	Pine plantation on Glen Road	*Pinus* species	Control wildings	Eradication	Physical removal	C-NE
Barrington Tops	The Glen Nature Reserve	Western entrance along Glen Road and around Pine plantation	*Asparagus asparagoides* (Bridal creeper)	Reduce spread through the reserve - minimal, controllable infestation	Asset protection	Hand removal	C-NE

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of Control	Action	Priority
Barrington Tops	The Glen Nature Reserve	Roadsides and trails	*Leucanthemum vulgare* (Ox-eye daisy), *Lilium formosanum* (Formosan lily)	*E. fergusonni* subsp*. fergusonni, E. largeana* (ROTAP), wet sclerophyll forest Reduce spread through the reserve	Asset protection	Monitor/ ground spray / hand removal	C-NE
Barrington Tops	The Glen Nature Reserve	Roadsides	*Sporobolus fertilis* (Giant Parramatta Grass)	*E. fergusonni* subsp*. fergusonni, E. largeana* (ROTAP), Wet sclerophyll forest	Asset protection	Ground spray	M-CP
Barrington Tops	The Glen Nature Reserve	Roadsides and trails	*Ageratina adenophora* (Crofton Weed)	*E. fergusonni* subsp*. fergusonni, E. largeana* (ROTAP), Wet sclerophyll forest Reduce spread through the reserve	Asset protection	Ground spray	L-PP
Barrington Tops	The Glen Nature Reserve	Biocontrol Sites	*Ageratina riparia* (Mistflower)	Assist with biocontrol research	Asset protection	Monitor	L-PP
Barrington Tops	The Glen Nature Reserve	Roadsides	*Ageratina riparia* (Mistflower), *Lantana camara*	*E. fergusonni* subsp*. fergusonni, E. largeana* (ROTAP), Wet sclerophyll forest	Asset protection	Ground spray	L-PP
Barrington Tops	Monkerai Nature Reserve	Roadsides and trails	*Lantana camara*, garden escapes	Dry to wet sclerophyll forest with gallery rainforest	Asset protection	Ground spray	L-PP
Barrington Tops	Watchimbark Nature Reserve	Roadsides and trails, wet gullies, Watchimbark Creek	*Ageratina adenophora* (Crofton Weed), *Ageratina riparia* (Mistflower), *Lantana camara, Araujia sericifera* (Moth Vine)	*Cynanchum elegans, Senna acclinis, Grevillea obtusifolia, Thesium australe* Head of catchment	Asset protection	Ground spray / hand removal	C-TSC
Barrington Tops	Watchimbark Nature Reserve	Open grassland, Watchimbark Creek	*Hypericum perforatum* (St John's Wort)	*Cynanchum elegans, Senna acclinis, Grevillea obtusifolia, Thesium australe* Head of catchment	Asset protection	Ground spray	C-NE
Barrington Tops	Woko National Park	Woko Camping Area	*Lantana camara, Araujia sericifera* (Moth Vine), *Delairea odorata* (Cape Ivy)	Floodplain Rainforest, *Cynanchum elegans*, Southern limit of *Elatostema stipitatum*, *Guilfoylia monostylis*	Asset protection	Ground spray / hand removal	C-TSC
Barrington Tops	Barrington Tops National Park	Sharpes Creek, Gloucester River, Dilgry River, Little Manning River	Amphibian chytrid fungus	*Mixophyes balbus* *Litoria davisae*	Containment (externally funded until June 2013)	Monitor	C-TSC
Barrington Tops	Barrington Tops National Park	Phytophthora Exclusion Zone	*Phytophthora cinnamomi*	Various plants, habitats and threatened species	Containment	Monitor	C-TSC
Great Lakes	Booti Booti National Park	Booti Booti National Park	Wild Dog (*Canis lupus familiaris*)	Neighbouring properties, predation of stock	Asset protection	Reactive program	L-PP
Great Lakes	Booti Booti National Park	Booti Booti National Park	Rabbit *(Oryctolagus cuniculus)*	Littoral Rainforest EEC, *Themeda* Grassland on Seacliffs and Coastal Headlands EEC, *Syzygium paniculatum*, *Cynanchum elegans*, *Persoonia katerae*	Asset protection	Reactive program	M-CP
Great Lakes	Booti Booti National Park	Booti Booti	Fox (*Vulpes vulpes*)	Neighbouring properties, predation of stock	Asset protection	Reactive program	L-PP
Great Lakes	Ghin-Doo-Ee Nature Reserve	Myall Lakes West	Wild Dog (*Canis lupus familiaris*)	Neighbouring properties, predation of stock	Asset protection	Strategic Program	C-EC
Great Lakes	Myall Lakes National Park	Myall Lakes East	Wild Dog (*Canis lupus familiaris*), Dingo (*Canis lupus dingo*)	Management of dingo population on Schedule 2 lands, public safety	Asset protection	Reactive program	C-HD

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of Control	Action	Priority
Great Lakes	Myall Lakes National Park	Myall Lakes West	Wild Dog (*Canis lupus familiaris*)	Neighbouring properties, predation of stock	Asset protection	Reactive program	L-PP
Great Lakes	Myall Lakes National Park	Nerong	Horse (*Equus calabus*)	Public safety	Asset protection	Reactive program	C-HD
Great Lakes	Myall Lakes National Park	Myall Lakes	Rabbit *(Oryctolagus cuniculus)*	Littoral Rainforest EEC, *Themeda* Grassland on Seacliffs and Coastal Headlands EEC, *Syzygium paniculatum*, *Cynanchum elegans*, *Persoonia katerae*	Asset protection	Reactive program	M-CP
Great Lakes	Myall Lakes National Park	Myall Lakes	Fox (*Vulpes vulpes*)	Monitor populations and impacts on biodiversity and neighbours	Asset protection	Reactive program	Window
Great Lakes	Wallingat National Park	Coomba Park	Deer (various species)	Public safety, neighbouring properties	Asset protection	Reactive program	C-HD
Great Lakes	Wallingat National Park	Wallingat National Park	Wild Dog (*Canis lupus familiaris*)	Neighbouring properties, predation of stock	Asset protection	Strategic Program	C-EC
Great Lakes	Wallingat National Park	Wallingat National Park	Fox (*Vulpes vulpes*)	Monitor populations and impacts on biodiversity and neighbours	Asset protection	Reactive program	Window
Great Lakes	All Reserves	Great Lakes Area	Cane Toad (*Bufo marinus*)	Monitor for new incursions	Asset protection	Eradication	C-TSC
Great Lakes	Booti Booti National Park	Site 164/466 - Booti Hill	*Chrysanthemoides monilifera* (Bitou Bush)*, Lantana camara, Senna pendula, Ipomoea* spp. (Morning Glory species), *Lilium formosanum* (Formosan lily)	*Themeda* Grassland on Seacliffs and Coastal Headlands EEC, Littoral Rainforest EEC, *Syzygium paniculatum*, *Persoonia katerae*, coastal woodland/forest, coastal scrub	Asset protection	Aerial & ground spray / hand removal	C-TSC
Great Lakes	Booti Booti National Park	Site 185 - Cape Hawke	*Delairea odorata* (Cape Ivy), *Asparagus aethiopicus* (Ground Asparagus), *Senna pendula, Lantana camara, Ipomoea* spp. (Morning Glory species), *Chrysanthemoides monilifera* (Bitou Bush)	*Themeda* Grassland on Seacliffs and Coastal Headlands EEC, Littoral Rainforest EEC, *Cynanchum elegans*, *Senna acclinis*, *Plectranthus cremnus*, *Cleistanthus cunninghamii*, *Jagera pseudorhus* var. *pseudorhus*, *Monococcus echinophorus*, *Planchonella myrsinifolia*, *Pisonia umbellifera*, coastal woodland/forest, coastal scrub	Asset protection	Aerial & ground spray / hand removal	C-TSC
Great Lakes	Booti Booti National Park	Site 193 - Charlotte Head, (including Shelly Beach)	*Chrysanthemoides monilifera* (Bitou Bush), *Lantana camara, Lilium formosanum* (Formosan lily), *Senna pendula, Passiflora* spp. (Passionfruit species)	*Themeda* Grassland on Seacliffs and Coastal Headlands EEC, Littoral Rainforest EEC, coastal woodland/forest, coastal scrub, coastal dune grassland/complex	Asset protection	Aerial & ground spray / hand removal	C-TSC
Great Lakes	Booti Booti National Park	Site 235 - Elizabeth Beach	*Asparagus plumosus/ aethiopicus* (Climbing/Ground Asparagus), *Chrysanthemoides monilifera* (Bitou Bush), *Lantana camara, Senna pendula, Ipomoea* spp. (Morning Glory species), *Lilium formosanum* (Formosan lily)	Littoral Rainforest EEC, *Syzygium paniculatum*, *Persoonia katerae*, coastal scrub, dune grasslands, frontal dune vegetation complex	Asset protection	Ground spray / hand removal	C-TSC

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of Control	Action	Priority
Great Lakes	Booti Booti National Park	Site 271 - Green Point wetlands and *Allocasuarina* habitat	*Asparagus plumosus/aethiopicus* (Climbing/Ground Asparagus), *Lantana camara, Ipomoea* spp., (Morning Glory species), *Chrysanthemoides monilifera* (Bitou Bush), *Senna pendula, Watsonia meriana* var. *bulbilifera* (Wild Watsonia)	Freshwater Wetlands on Coastal Floodplains EEC, Swamp Sclerophyll Forest EEC, Swamp Oak Floodplain Forest EEC, *Allocasuarina defungens*, *Allocasuarina simulans*, *Corunastylis littoralis*, *Plectranthus cremnus*, dry heath, wet heath and coastal forest	Asset protection	Ground spray / hand removal	C-TSC
Great Lakes	Booti Booti National Park	Site 470 - Seven Mile Beach and Janie's Corner	*Chrysanthemoides monilifera* (Bitou Bush), *Asparagus aethiopicus* (Ground Asparagus), *Ipomoea* spp. (Morning Glory species) *Lantana camara, Bryophyllum delagoense* (Mother of millions), *Arctotheca populifolia* (Beach Daisy),	Littoral Rainforest EEC, *Chamaesyce psammogeton*, coastal scrub, dune grasslands, frontal dune vegetation complex	Asset protection	Aerial & ground spray / hand removal	C-TSC
Great Lakes	Booti Booti National Park	Site 490/163 - South Seven Mile Beach Littoral Rainforest	*Asparagus plumosus/ aethiopicus* (Climbing/Ground Asparagus), *Senna pendula, Ipomoea* spp. (Morning Glory species), *Rubus fruticosus* (Blackberry), *Lantana camara, Chrysanthemoides monilifera* (Bitou bush)	Littoral Rainforest EEC, *Syzygium paniculatum*, *Cynanchum elegans*, *Persoonia katerae*	Asset protection	Aerial & ground spray / hand removal	C-TSC
Great Lakes	Booti Booti National Park	Site 537 - Wallis Lake Eastern Foreshore	*Chrysanthemoides monilifera* (Bitou Bush), *Senna pendula, Asparagus plumosus/ aethiopicus* (Climbing/Ground Asparagus), *Ipomoea* spp. (Morning Glory species)	Swamp Oak Floodplain Forest EEC, Swamp Sclerophyll Forest on Coastal Floodplains EEC, Littoral Rainforest EEC, *Cynanchum elegans*, *Senna acclinis*, *Corunastylis littoralis, Plectranthus cremnus*	Asset protection	Ground spray / hand removal	C-TSC
Great Lakes	Darawank Nature Reserve	Site 360 - Nine Mile Beach	*Chrysanthemoides monilifera* (Bitou Bush), *Asparagus aethiopicus* (Ground Asparagus)	Littoral Rainforest EEC, *Chamaesyce psammogeton*, *Persoonia katerae*, frontal dune complex, coastal sand dune complex, coastal scrub	Asset protection	Ground spray / hand removal	C-TSC
Great Lakes	Ghin-Doo-Ee National Park	Site 263 - Roadsides	*Lantana camara,* bushland weeds	Sydney Blue Gum Forest / Sub Tropical Rainforest, investigate location of threatened spp and communities and target response, also required to maintain access on management trails.	Asset protection	Ground spray / hand removal	Window
Great Lakes	Minimbah Nature Reserve	Minimbah Nature Reserve	*Lantana camara, Pinus elliottii* (Slash Pine), *Erythrina* x *sykesii* (Coral Tree),*Gomphocarpus fruticosus* (Narrow-leaved cotton bush)	Coastal Saltmarsh EEC, Swamp Oak Floodplain Forest EEC	Asset protection	Ground spray / hand removal	L-PP

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of Control	Action	Priority
Great Lakes	Myall Lakes National Park	Site 202 - Coastline from Banksia Green to southern park boundary	*Chrysanthemoides monilifera* (Bitou Bush) *Lantana camara* (in forests), exotic beach herbs	*Chamaesyce psammogeton*, *Senecio spathulatus*, *Stackhousia spathulata*, coastal scrub, coastal forest/woodland, coastal sand dune grassland/complex, headland heath, coastal Banksia woodland, coastal heath, Ramsar wetlands (sandy and rocky shores)	Asset protection	Aerial & ground spray / hand removal	C-TSC
Great Lakes	Myall Lakes National Park	Site 203 - Coastline from Big Gibber to Banksia Green	*Chrysanthemoides monilifera* (Bitou Bush) *Lantana camara*, *Senna pendula* (in forests), exotic beach herbs	Littoral Rainforest EEC, *Themeda* Grassland on Seacliffs and Coastal Headlands EEC, *Chamaesyce psammogeton*, *Senecio spathulatus*, *Stackhousia spathulata*, coastal scrub, coastal forest/woodland, coastal dune grassland/complex, headland heath, coastal Banksia woodland, Ramsar wetlands (sandy and rocky shores)	Asset protection	Aerial & ground spray / hand removal	C-TSC
Great Lakes	Myall Lakes National Park	Site 451 - Sandbar to Number One Beach Coastline (Yellowrock/Bridge Hill)	*Chrysanthemoides monilifera* (Bitou Bush), *Lantana camara, Senna pendula, Asparagus* spp*, Opuntia stricta* (Prickly Pear)	Littoral Rainforest EEC, *Themeda* Grassland on Seacliffs and Coastal Headlands EEC, *Syzygium paniculatum*, headland woodland, coastal forest, Ramsar wetlands (sandy and rocky shores)	Asset protection	Aerial & ground spray / hand removal	C-TSC
Great Lakes	Myall Lakes National Park	Site 457 - Seal Rocks headlands, beaches and rainforest	*Anredera cordifolia* (Madeira Vine), *Asparagus plumosus/ aethiopicus* (Climbing/Ground Asparagus), *Chrysanthemoides monilifera* (Bitou Bush), *Lantana camara, Senna pendula, Bryophyllum delagoense* (Mother of millions), *Yucca aloifolia*, *Opuntia stricta* (Prickly Pear), exotic beach herbs	Littoral Rainforest EEC, *Themeda* Grassland on Seacliffs and Coastal Headlands EEC, *Syzygium paniculatum*, *Senna acclinis*, *Senecio spathulatus*, coastal forest, headland woodland, headland heath, coastal dune grasslands and dune complex, coastal scrub, Ramsar wetlands (sandy and rocky shores).	Asset protection	Aerial & ground spray / hand removal	C-TSC
Great Lakes	Myall Lakes National Park	Site 474 - Shores of Myall Lake and inshore islands	*Lantana camara, Chrysanthemoides monilifera* (Bitou Bush)*, Ipomoea* spp. (Morning Glory species), *Senna pendula, Xanthium occidentale* (Noogoora burr)*, Erythrina* x *sykesii* (Coral Tree)	Littoral Rainforest EEC, Swamp Sclerophyll Forest EEC, Swamp Oak Floodplain Forest EEC, Freshwater Wetlands on Coastal Floodplains EEC, Ramsar wetlands (tree & shrub dominated wetlands).	Asset protection	Ground spray / hand removal	C-TSC
Great Lakes	Myall Lakes National Park	Site 475 - Shores of the Boolambayte Lake, Creek and inshore islands	*Asparagus plumosus* (Climbing Asparagus), *Lantana camara, Chrysanthemoides monilifera* (Bitou Bush)*, Araujia sericifera* (Moth Vine), *Senna pendula, Xanthium occidentale* (Noogoora burr)*, Erythrina* x *sykesii* (Coral Tree), *Passiflora* spp. (Passionfruit species), *Ageratina adenophora* (Crofton Weed)	Swamp Oak Floodplain Forest EEC, Swamp Sclerophyll Forest EEC, Freshwater Wetlands on Coastal Floodplains EEC, Ramsar wetlands (tree & shrub dominated wetlands).	Asset protection	Ground spray / hand removal	C-TSC

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of Control	Action	Priority
Great Lakes	Myall Lakes National Park	Shores of the Bombah Broadwater (including Mungo Brush) and Nerong Creek	*Chrysanthemoides monilifera* (Bitou Bush)*, Asparagus plumosus* (Climbing Asparagus), *Cortaderia selloana* (Pampas grass)*, Lantana camara, Senna pendula, Passiflora* spp. (Passionfruit species)*,), Erythrina* x *sykesii* (Coral Tree), *Pinus elliottii (Slash Pine), Opuntia stricta (Prickly Pear), Thunbergia alata* (Black-eyed Susan)	Littoral Rainforest EEC, Swamp Sclerophyll Forest EEC, Swamp Oak Floodplain Forest EEC, Freshwater Wetlands on Coastal Floodplains EEC, *Cynanchum elegans*, *Syzygium paniculatum*, *Senna acclinis*, Ramsar wetlands (tree & shrub dominated wetlands).	Asset protection	Ground spray / hand removal	C-TSC
Great Lakes	Myall Lakes National Park	Site 478 - Smith's Lake foreshore and wetlands	*Chrysanthemoides monilifera* (Bitou Bush), *Lantana camara, Rubus fruticosus* (Blackberry), *Senna pendula*	Swamp Sclerophyll Forest EEC, Swamp Oak Floodplain Forest EEC, Freshwater Wetlands on Coastal Floodplains EEC, coastal forest/woodland, Ramsar wetlands (tree & shrub dominated wetlands).	Asset protection	Ground spray / hand removal	C-TSC
Great Lakes	Myall Lakes National Park	Site 521 - Treachery Beach/Yagon Gibber/Submarine and Fiona Beach	*Chrysanthemoides monilifera* (Bitou Bush), *Lantana camara, Senna pendula,* exotic beach herbs	Littoral Rainforest EEC, *Themeda* Grassland on Seacliffs and Coastal Headlands EEC, *Chamaesyce psammogeton*, *Senecio spathulatus*, *Stackhousia spathulata*, coastal forest/woodlands, coastal scrub, dune grasslands/complex, Ramsar wetlands (tree & shrub dominated wetlands).	Asset protection	Aerial & ground spray / hand removal	C-TSC
Great Lakes	Myall Lakes National Park	Site 528 - Upper and Lower Myall River riparian and wetland areas	*Chrysanthemoides monilifera* (Bitou Bush)*, Pinus elliottii* (Slash Pine)*, Senna pendula, Lantana camara, Ipomoea* spp. (Morning Glory species), *Cortaderia selloana* (Pampas grass)*, Camphor laurel* (Cinnamomum camphora), *Erythrina* x *sykesii* (Coral Tree)	Littoral Rainforest EEC, Swamp Sclerophyll Forest EEC, Swamp Oak Floodplain Forest EEC, Freshwater Wetlands on Coastal Floodplains EEC, Coastal Saltmarsh EEC, riparian forest, Ramsar wetlands (tree & shrub dominated wetlands; intertidal wetlands).	Asset protection	Ground spray / hand removal	C-TSC
Great Lakes	Myall Lakes National Park	Site 555 - Waterways of the Myall Lakes	Aquatic weeds eg *Salvinia molesta* (past infestation via Boolambayte Creek), *Myriophyllum aquaticum* (Parrot's Feather - current infestation via Myall River), *Cabomba carolina* (dams adjacent in catchment)	Freshwater Wetlands on Coastal Floodplains EEC, Ramsar wetlands (coastal brackish lagoons, permanent rivers/creeks/streams)	Asset protection	Ground spray / hand removal	C-TSC
Great Lakes	Myall Lakes National Park	Site 581 - Yacaaba Headland	*Chrysanthemoides monilifera* (Bitou Bush)*, Ipomoea* spp. (Morning Glory species), *Lantana camara*	Littoral Rainforest EEC, *Syzygium paniculatum*, *Cynanchum elegans*, headland heath, coastal forest/woodland, *Themeda* Grassland on Seacliffs and Coastal Headlands EEC, Ramsar wetlands (sandy and rocky shores)	Asset protection	Aerial & ground spray / hand removal	C-TSC
Great Lakes	Myall Lakes National Park	Mungo Beach	*Chrysanthemoides monilifera* (Bitou Bush) Bitou TAP monitoring transects	*Cynanchum elegans*, *Senecio spathulatus*, *Stackhousia spathulata*	Asset protection	Monitor	C-TSC

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of Control	Action	Priority
Great Lakes	Myall Lakes National Park	Treachery Headland	*Chrysanthemoides monilifera* (Bitou Bush) Bitou TAP monitoring transects	Littoral Rainforest EEC, *Themeda* Grassland on Seacliffs and Coastal Headlands EEC	Asset protection	Monitor	C-TSC
Great Lakes	Myall Lakes National Park	Lighthouse Beach	*Chrysanthemoides monilifera* (Bitou Bush) Bitou TAP monitoring transects	Littoral Rainforest EEC	Asset protection	Monitor	C-TSC
Great Lakes	Myall Lakes National Park	Lower Myall River	*Pinus elliottii* (Slash Pine)	Prepare and implement control plan for removal of plantation	Eradication	Develop control strategy	C-TSC
Great Lakes	Myall Lakes National Park	Seal Rocks	Myrtle Rust	Littoral Rainforest EEC	Asset protection	Monitor / Spray	C-TSC
Great Lakes	Myall Lakes National Park	The Grandis	Bushland weeds	Heritage and recreational site	Asset protection	Ground spray / hand removal	H-IH
Great Lakes	Myall Lakes National Park	Roadsides, access and management trails	*Lantana camara*, bushland weeds	Maintenance of existing program, reduce spread through reserve	Asset protection	Ground spray / hand removal	L-PP
Great Lakes	Wallis Island, Yahoo Island, Bandicoot Island, Flat Island Nature, Regatta Island, Durands Island, Mill's Island, Coolongolook nature reserves, and Booti Booti National Park	Site 539 - Wallis Lake Islands (Booti, Snake, Earps, Coomba, Black Rocks Pelican, Shepherd and Little Snake Islands)	*Anredera cordifolia* (Madeira Vine), *Asparagus* spp., *Chrysanthemoides monilifera* (Bitou Bush), *Ageratina adenophora* (Crofton Weed), *Cortaderia selloana* (Pampas grass), *Ipomoea cairica* (Coastal Morning Glory), *Lantana camara, Senna pendula, Delairea odorata* (Cape Ivy)	Swamp Sclerophyll Forest on Coastal Floodplains EEC, Swamp Oak Floodplain Forest EEC, Littoral Rainforest EEC, Coastal Saltmarsh EEC, Freshwater Wetlands on Coastal Floodplains EEC, *Asperula asthenes*, coastal forest	Asset protection	Ground spray / hand removal	C-TSC
Great Lakes	Wallingat National Park	Roadsides, access and management trails	*Lantana camara*, bushland weeds	Maintenance of existing program, reduce spread through reserve	Asset protection	Ground spray	L-PP
Hunter Coast	Off Park	Tilligerry Peninsular	Fox (*Vulpes vulpes*)	Bush Stone-Curlew, Beach Stone-curlew	Asset protection	Reactive program	C-TSC
Hunter Coast	Corrie Island Nature Reserve	Corrie Island	Wild Dog (*Canis lupus familiaris*), Fox (*Vulpes vulpes*)	Beach nesting shorebirds, including Pied Oystercatcher	Asset protection	Monitor / Reactive program	C-TSC
Hunter Coast	John Gould Nature Reserve	Cabbage Tree Island	Pest Birds (Corvids)	Gould's Petrel	Asset protection	Annual Program	C-TSC
Hunter Coast	John Gould Nature Reserve	Cabbage Tree Island	Black Rat (*Rattus rattus*)	Gould's Petrel	Asset protection	Monitor	C-TSC
Hunter Coast	Myall Lakes National Park	Broughton Island	Rabbit *(Oryctolagus cuniculus* / Black Rat (*Rattus rattus*) / House Mouse (*Mus musculus*)	Post-eradication general monitoring for re-incursions	Asset protection	Monitor / bait	C-TSC

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of Control	Action	Priority
Hunter Coast	Myall Lakes National Park	Broughton Island	Rabbit *(Oryctolagus cuniculus* / Black Rat (*Rattus rattus*) / House Mouse (*Mus musculus*)	Post-eradication Seabird Monitoring	Asset protection	Monitor	C-TSC
Hunter Coast	Tomaree National Park	Tomaree	Fox (*Vulpes vulpes*)	Neighbouring properties, predation of stock	Asset protection	Annual program	M-CP
Hunter Coast	Tilligerry State Conservation Area	Tilligerry	Rabbit *(Oryctolagus cuniculus)*	Cooperative program with Port Stephens Council	Asset protection	Reactive Program	M-CP
Hunter Coast	Tomaree National Park	Tomaree	Rabbit *(Oryctolagus cuniculus)*	Cooperative program with Port Stephens Council	Asset protection	Reactive Program	M-CP
Hunter Coast	Worimi Conservation Lands	Worimi CL	Fox (*Vulpes vulpes*)	Beach nesting shorebirds, including Little Tern, Pied Oystercatcher	Asset protection	Strategic Program	C-TSC
Hunter Coast	Worimi Conservation Lands	Worimi CL	Rabbit *(Oryctolagus cuniculus)*	Cooperative program with Port Stephens Council	Asset protection	Reactive Program	M-CP
Hunter Coast	All Reserves	Hunter Coast Area	Cane Toad (*Bufo marinus*)	Monitor for new incursions	Asset protection	Eradication	C-TSC
Hunter Coast	All Reserves	Koala Program	Wild Dog (*Canis lupus familiaris*)	Neighbouring properties, predation of stock, Koala population	Asset protection	Strategic Program	C-TSC
Hunter Coast	Boondelbah Nature Reserve	Boondelbah Nature Reserve	*Opuntia stricta* (Prickly Pear), *Ipomoea* spp. (Morning Glory species), *Chrysanthemoides monilifera* (Bitou Bush)	Gould's Petrel, Little Penguin	Asset protection	Ground spray / hand removal	C-TSC
Hunter Coast	John Gould Nature Reserve	Cabbage Tree Island	*Opuntia stricta* (Prickly Pear), *Ipomoea* spp. (Morning Glory species), *Chrysanthemoides monilifera* (Bitou Bush)	*Pisonia umbellifera*, Littoral Rainforest EEC, Gould's Petrel	Asset protection	Aerial & ground spray / hand removal	C-TSC
Hunter Coast	Myall Lakes National Park	Broughton Island	*Chrysanthemoides monilifera* (Bitou Bush), *Opuntia stricta* (Prickly Pear), *Ipomoea* spp. (Morning Glory species), *Stenotaphrum secundatum* (Buffalo Grass), *Ageratina adenophora* (Crofton Weed)	*Themeda* Grassland on Seacliffs and Coastal Headlands EEC, Little Penguins - northern limit, headland heath	Asset protection	Ground spray / hand removal	C-TSC
Hunter Coast	Myall Lakes National Park	Broughton Island	Post-Rabbit Eradication Vegetation Monitoring	*Themeda* Grassland on Seacliffs and Coastal Headlands EEC, Little Penguins - northern limit, headland heath	Asset protection	Monitor	C-TSC
Hunter Coast	Seaham Swamp Nature Reserve	Quarry site	*Bryophyllum delagoense* (Mother of millions)	Cultural Heritage site	Asset protection	Ground spray / hand removal	H-CH
Hunter Coast	Seaham Swamp Nature Reserve	Swamp and surrounding lands	Bushland and aquatic weeds	Swamp Oak Floodplain Forest EEC, Swamp Sclerophyll Forest EEC Community cooperative program	Asset protection	Ground spray / hand removal	M-RA

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of Control	Action	Priority
Hunter Coast	Snapper Island Nature Reserve	Rainforest Rehabilitation	*Lantana camara, Asparagus plumosus* (Climbing Asparagus)	Littoral Rainforest EEC	Asset protection	Ground spray / hand removal	C-TSC
Hunter Coast	Stormpetrel Nature Reserve	Stormpetrel	*Chrysanthemoides monilifera* (Bitou Bush)	Migratory shorebirds	Asset protection	Aerial spray	Window
Hunter Coast	Tilligerry Nature Reserve	Taylor's Beach	*Chrysanthemoides monilifera* (Bitou Bush), *Lantana camara, Senna pendula, Asparagus plumosus* (Climbing Asparagus)	Blackbutt forest, Koala habitat, Swamp Oak Floodplain Forest EEC, Coastal Saltmarsh EEC, mangroves	Asset protection	Ground spray / hand removal	C-TSC
Hunter Coast	Tilligerry State Conservation Area		*Pinus* species	Koala habitat, Swamp Oak Floodplain Forest EEC, Coastal Saltmarsh EEC	Asset protection	Physical removal	Window
Hunter Coast	Tilligerry State Conservation Area	Banksia Grove Village	*Eichhornia crassipes* (Water Hyacinth)	Control Class 4 Noxious Weed in Port Stephens LGA Potential spread into adjacent waterways	Eradication	Physical removal	C-NE
Hunter Coast	Tomaree National Park	Anna Bay Headland	*Chrysanthemoides monilifera* (Bitou Bush)	*Themeda* Grassland on Seacliffs and Coastal Headlands EEC, Headland Heath	Asset protection	Ground spray / hand removal	C-TSC
Hunter Coast	Tomaree National Park	Fishermans Bay	*Chrysanthemoides monilifera* (Bitou Bush)	*Pultenaea maritima (*Coastal Bush-pea), Headland Heath	Asset protection	Aerial & ground spray / hand removal	C-TSC
Hunter Coast	Tomaree National Park	Kingsley Beach / Boat Harbour	*Chrysanthemoides monilifera* (Bitou Bush)	Headland Heath	Asset protection	Aerial & ground spray / hand removal	C-TSC
Hunter Coast	Tomaree National Park	Fingal Beach	*Chrysanthemoides monilifera* (Bitou Bush)	Freshwater wetlands EEC, Headland Heath	Asset protection	Aerial & ground spray / hand removal	C-TSC
Hunter Coast	Tomaree National Park	Wreck Beach / Stephens Peak	*Chrysanthemoides monilifera* (Bitou Bush)	Headland Heath, *Melaleuca groveana*	Asset protection	Aerial & ground spray / hand removal	C-TSC
Hunter Coast	Tomaree National Park	Fingal Spit	*Chrysanthemoides monilifera* (Bitou Bush)	Headland Heath, *Senecio spathulatus*	Asset protection	Aerial & ground spray / hand removal	C-TSC

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of Control	Action	Priority
Hunter Coast	Tomaree National Park	Fishermans Bay	*Chrysanthemoides monilifera* (Bitou Bush) Bitou TAP monitoring transects	*Pultenaea maritima (*Coastal Bush-pea), Headland Heath	Asset protection	Monitor	C-TSC
Hunter Coast	Tomaree National Park	Tomaree Headland	*Chrysanthemoides monilifera* (Bitou Bush), *Polygala myrtifolia* (Polygala), *Asparagus* species	Cultural Heritage sites	Asset protection	Ground spray / hand removal	H-CH
Hunter Coast	Tomaree National Park	Point Stephens Lighthouse Precinct	*Rubus fruticosa* agg. (Blackberry), *Chrysanthemoides monilifera* (Bitou Bush)	Cultural Heritage site	Asset protection	Aerial & ground spray / hand removal	M-RA
Hunter Coast	Tomaree National Park	Iris Moore Reserve	*Crithmum maritimum*	Coastal Scrub, Coastal Banksia Woodland	Asset protection	Ground spray / hand removal	M-RA
Hunter Coast	Tomaree National Park	Tomaree National Park	*Chrysanthemoides monilifera* (Bitou Bush), including bush regeneration programs	*Themeda* Grassland on Seacliffs and Coastal Headlands EEC, Headland Heath, maintenance of 20+ year program	Asset protection	Aerial & ground spray / hand removal	C-TSC
Hunter Coast	Tomaree National Park	Iris Moore Reserve, One Mile Beach Hind dunes	*Acetosa sagittata* (Turkey Rhubarb)	Coastal Scrub	Asset protection	Ground spray	M-RA
Hunter Coast	Wallaroo National Park	Roadsides and trails	*Lantana camara*	Spotted Gum/Ironbark Forest, *Tetratheca juncea*	Asset protection	Ground spray	L-PP
Hunter Coast	Wallaroo National Park	Wallaroo National Park	*Erythrina x sykesii* (Coral Tree)	Spotted Gum/Ironbark Forest, *Tetratheca juncea*	Eradication	Physical removal	L-PP
Hunter Coast	Worimi Conservation Lands	Weed Management Plan	Weed Management Plan	*Diuris arenaria, D. praecox, Senecio spathulatus, Eucalyptus parramattensis* ssp. *decadens*	Asset protection	Develop weed management strategy	C-TSC
Hunter Coast	Worimi Conservation Lands	Stockton Beach	*Chrysanthemoides monilifera* (Bitou Bush)	*Diuris praecox, Senecio spathulatus, Eucalyptus parramattensis* ssp. *decadens*, Foredune Spinifex, Frontal Dune Blackbutt-Apple Forest	Asset protection	Aerial & ground spray	C-TSC
Hunter Coast	Worimi Conservation Lands		*Cortaderia* species (Pampas Grass)	Foredune Spinifex	Asset protection	Ground spray	L-PP
Hunter Coast	Worimi Regional Park	Fern Bay	*Phyllostachys aurea* (Bamboo), Garden escapes	*Eucalyptus parramattensis* ssp. *decadens*	Asset protection	Ground spray / hand removal	C-NE
Hunter Coast	Worimi Conservation Lands	Worimi National Park/RP	*Erythrina x sykesii* (Coral Tree)		Eradication	Physical removal	L-PP

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of Control	Action	Priority
Hunter Coast	Port Stephens In-shore Reserves	Biennial Shorebird Monitoring	Various weeds	Migratory Shorebirds	Asset protection	Monitor	C-TSC
Manning	Off-Park, Khappinghat Nature Reserve, Towibakh National Park, Crowdy Bay National Park	Manning Estuary	Fox (*Vulpes vulpes*)	Beach nesting shorebirds (Little Tern, Pied Oystercatcher, Beach Stone-curlew)	Asset protection	Strategic Program	C-TSC
Manning	Off-Park	Manning Estuary	Pest Birds (Corvids and Gulls)	Beach nesting shorebirds (Little Tern, Pied Oystercatcher, Beach Stone-curlew)	Asset protection	Strategic Program	C-TSC
Manning	Off-Park, Crowdy Bay National Park	Crowdy Bay	Cane Toad (*Bufo marinus*)	Monitor for new incursions	Asset protection	Eradication	C-TSC
Manning	Barakee National Park/State Conservation Area	Barakee National Park	Wild Dog (*Canis lupus familiaris*)	Neighbouring properties, predation of stock	Asset protection	Reactive Program	C-EC
Manning	Barakee National Park/State Conservation Area	Barakee National Park	Horse (*Equus calabus*)	Environmental degradation	Asset protection	Monitor / Strategic program	Window
Manning	Biriwal-Bulga National Park	Biriwal-Bulga National Park	Wild Dog (*Canis lupus familiaris*)	Neighbouring properties, predation of stock	Asset protection	Strategic Program	C-EC
Manning	Crowdy Bay National Park	Crowdy Bay National Park	Wild Dog (*Canis lupus familiaris*), Dingo (*Canis lupus dingo*)	Public safety	Asset protection	Reactive Program	C-HD
Manning	Goonook Nature Reserve	Goonook	Wild Dog (*Canis lupus familiaris*)	Neighbouring properties, predation of stock	Asset protection	Reactive Program	C-EC
Manning	Goonook Nature Reserve, Tapin Tops National Park, Barakee National Park/State Conservation Area	Manning Area	Feral Pig (*Sus scrofa*)	Environmental degradation, neighbouring properties	Eradication	Reactive Program	Window
Manning	Khappinghat Nature Reserve	Khappinghat National Park	Wild Dog (*Canis lupus familiaris*)	Public safety, predation of stock	Asset protection	Strategic Program	C-HD
Manning	Saltwater National Park	Saltwater National Park	Rabbit *(Oryctolagus cuniculus)*	Littoral Rainforest EEC, *Syzygium paniculatum*	Asset protection	Reactive Program	M-RA
Manning	Talawahl National Park	Talawahl National Park	Wild Dog (*Canis lupus familiaris*)	Public safety, predation of stock	Asset protection	Strategic Program	C-HD

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of Control	Action	Priority
Manning	Tapin Tops National Park	Tapin Tops National Park	Wild Dog (*Canis lupus familiaris*)	Neighbouring properties, predation of stock	Asset protection	Strategic Program	C-EC
Manning	Wingham Brush Nature Reserve	Wingham Brush	Pest Birds (Corvids)	Grey-headed Flying Fox colony	Asset protection	Annual Program	C-TSC
Manning	Biriwal-Bulga National Park, Tapin Tops National Park	Pine plantation	*Pinus* species	Prepare and implement control plan for removal of plantation	Eradication	Develop control strategy	C-EC
Manning	Coocumbac Island Nature Reserve	Coocumbac Island Nature Reserve	*Anredera cordifolia* (Madeira Vine), *Macfadyena unguis-cati* (Cat's Claw Creeper), *Lantana camara, Ipomoea* spp. (Morning Glory species), *Tradescantia fluminensis* (Wandering Jew), *Senna pendula, Passiflora subpeltata* (White Passionfruit)	Lowland Rainforest on Floodplain EEC, mangroves	Asset protection	Ground spray / hand removal	C-TSC
Manning	Crowdy Bay National Park	Harrington - Crowdy Head Rd	*Chrysanthemoides monilifera* (Bitou Bush)	Littoral Rainforest EEC	Asset protection	Aerial & ground spray / hand removal	C-TSC
Manning	Crowdy Bay National Park	The Gap - southern end of Crowdy Bay National Park	*Chrysanthemoides monilifera* (Bitou Bush), *Asparagus* spp.	Littoral Rainforest EEC	Asset protection	Ground spray / hand removal	C-TSC
Manning	Crowdy Bay National Park	South	*Chrysanthemoides monilifera* (Bitou Bush)	Littoral Rainforest EEC, *Ischaemum triticeum*, *Stackhousia spathulata*, *Diuris flavescens*, *Allocasuarina defungens*, *Allocasuarina simulans*	Asset protection	Aerial & ground spray / hand removal	C-TSC
Manning	Crowdy Bay National Park	Coopernook	*Baccharis halimifolia* (Groundsel Bush)	Wetlands Cooperative program with adjoining private property	Asset protection	Aerial spray	C-TSC
Manning	Crowdy Bay National Park	Pond	*Pistia stratiotes* (Water lettuce), *Salvinia molesta* (Salvinia), *Eichhornia crassipes* (Water Hyacinth (Water Hyacinth)	Control Class 1 Noxious Weed (Water Lettuce), others Class 3, threat to surrounding waterways, Littoral Rainforest EEC, sedgelands, swamp forest	Asset protection	Ground spray / hand removal	C-NE
Manning	Crowdy Bay National Park, Talawahl National Park	Pine plantation	*Pinus* species	Prepare and implement control plan for removal of plantation	Eradication	Develop control strategy	C-NE
Manning	Crowdy Bay National Park, Khappinghat Nature Reserve		*Erythrina x sykesii* (Coral Tree)	Littoral Rainforest EEC	Eradication	Physical removal	C-NE
Manning	Khappinghat Nature Reserve	Arboretum	Non-endemic Eucalypt Species	Tallowwood, flooded gum, turpentine and brushbox (wet sclerophyll)	Eradication	Physical removal	C-NE

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of Control	Action	Priority
Manning	Khappinghat Nature Reserve	Khappinghat Creek	*Juncus acutus* (Sharp Rush)	Wetland	Asset protection	Ground spray	C-NE
Manning	Khappinghat Nature Reserve	Beach foredunes	*Chrysanthemoides monilifera* (Bitou Bush) Bitou monitoring transects	Foredune Spinifex, maintenance of previous control program	Asset protection	Monitor	L-PP
Manning	Lansdowne Nature Reserve	Lansdowne Nature Reserve	*Anredera cordifolia* (Madeira Vine), *Macfadyena unguis-cati* (Cat's Claw Creeper), *Lantana camara, Ipomoea* spp. (Morning Glory species), *Tradescantia fluminensis* (Wandering Jew), *Senna pendula, Passiflora subpeltata* (White Passionfruit)	Lowland Rainforest on Floodplain EEC	Asset protection	Ground spray / hand removal	C-TSC
Manning	Saltwater National Park	Lagoon Dunes and North to Park Boundary	*Asparagus* spp., *Delairea odorata* (Cape Ivy), *Bryophyllum delagoense* (Mother of Millions), *Agave americana* (Century Plant), *Lantana camara, Opuntia stricta* (Prickly Pear), *Chrysanthemoides monilifera* (Bitou Bush)	Littoral Rainforest EEC	Asset protection	Ground spray / hand removal	C-TSC
Manning	Saltwater National Park		*Senna pendula*	Littoral Rainforest EEC, wetland, *Melaleuca* swamp forest	Asset protection	Ground spray / hand removal	C-TSC
Manning	Saltwater National Park	Surfers Car Park	Myrtle Rust	Littoral Rainforest EEC	Asset protection	Monitor / Spray	C-TSC
Manning	Saltwater National Park	Hinddunes	*Gloriosa superba* (Glory Lily)	Investigation required	Asset protection	Monitor	C-NE
Manning	Saltwater National Park, Khappinghat National Park	Wallabi Point Headland (Saltwater Headland) and Saltwater Beach	*Chrysanthemoides monilifera* (Bitou Bush), *Opuntia stricta* (Prickly Pear), *Asparagus* spp., *Lantana camara*	Littoral Rainforest EEC, *Westringia fruticosa*	Asset protection	Aerial & ground spray / hand removal	C-TSC
Manning	Tapin Tops National Park, Talawahl National Park, Coorabakh National Park	Roadsides and trails	Bushland weeds	Wet sclerophyll and sub tropical rainforest, palm forest, Rudders Box (*E. rudderi*)	Asset protection	Ground spray	C-NE
Manning	Towibakh Nature Reserve	Towibakh Nature Reserve	*Cinnamomum camphora* (Camphor Laurel)	Swamp sclerophyll, remnant blackbutt forest (locally significant)	Asset protection	Physical removal	C-NE

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of Control	Action	Priority
Manning	Wingham Brush Nature Reserve	Wingham Brush Nature Reserve	*Anredera cordifolia* (Madeira Vine), *Macfadyena unguis-cati* (Cat's Claw Creeper), *Lantana camara, Ipomoea* spp. (Morning Glory species), *Tradescantia fluminensis* (Wandering Jew), *Senna pendula, Passiflora subpeltata* (White Passionfruit)	Lowland Rainforest on Floodplain EEC; Grey-headed Flying-fox colony	Asset protection	Ground spray / hand removal	C-TSC
Manning	Khappinghat National Park, Talawahl National Park, Coorabakh National Park	Lantana Biocontrol Sites	*Lantana camara*	Swamp sclerophyll, remnant blackbutt forest (locally significant)	Asset protection	Monitor	L-PP
Manning	All Reserves	All Reserves	*Lantana camara*	Various	Asset protection	Ground spray	L-PP
Manning	All Reserves	All Reserves	*Rubus fruticosus* agg. (Blackberry)	Various	Asset protection	Ground spray	L-PP
Manning	All Reserves	All Reserves	*Sporobolus fertilis* (Giant Parramatta Grass)	Various	Asset protection	Ground spray	L-PP
Upper Hunter	Back River Nature Reserve	Back River	Wild Dog (*Canis lupus familiaris*)	Neighbouring properties, predation of stock	Asset protection	Strategic program	C-EC
Upper Hunter	Barrington Tops National Park/State Conservation Area	Barrington Plateau	Fox (*Vulpes vulpes*)	Broad-toothed Rat	Asset protection	Biannual baiting	C-TSC
Upper Hunter	Barrington Tops National Park/State Conservation Area	Barrington Plateau	Wild Dog (*Canis lupus familiaris*)	Neighbouring properties, predation of stock	Asset protection	Strategic program	C-EC
Upper Hunter	Barrington Tops National Park	Barrington Plateau	Cat (*Felis catus*)	Broad-toothed Rat	Asset protection	Reactive Program	C-TSC
Upper Hunter	Barrington Tops National Park/State Conservation Area	Barrington Plateau	Feral Pig (*Sus scrofa*)	Montane Peatlands and Swamps EEC, Broad-toothed Rat	Asset protection	Strategic program	C-TSC
Upper Hunter	Barrington Tops National Park/State Conservation Area	Barrington Plateau	Horse (*Equus calabus*)	Montane Peatlands and Swamps EEC, Broad-toothed Rat	Asset protection	Monitor / Strategic Program	C-TSC
Upper Hunter	Ben Halls Gap National Park	Ben Halls Gap	Wild Dog (*Canis lupus familiaris*)	Neighbouring properties, predation of stock	Asset protection	Strategic program	C-EC

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of Control	Action	Priority
Upper Hunter	Ben Halls Gap National Park	Ben Halls Gap	Feral Pig (*Sus scrofa*)	Neighbouring properties	Asset protection	Strategic program	C-TSC
Upper Hunter	Camerons Gorge Nature Reserve/State Conservation Area	Camerons Gorge	Wild Dog (*Canis lupus familiaris*)	Neighbouring properties, predation of stock	Asset protection	Strategic program	C-EC
Upper Hunter	Crawney Pass National Park	Crawney Pass	Wild Dog (*Canis lupus familiaris*)	Neighbouring properties, predation of stock	Asset protection	Strategic program	M-CP
Upper Hunter	Curracabundi National Park	Kalungra	Wild Dog (*Canis lupus familiaris*)	Neighbouring properties, predation of stock	Asset protection	Strategic program	M-CP
Upper Hunter	Murrurundi Pass National Park	Murrurundi Pass	Wild Dog (*Canis lupus familiaris*)	Neighbouring properties, predation of stock	Asset protection	Strategic program	C-EC
Upper Hunter	Tomalla Nature Reserve	Tomalla	Wild Dog (*Canis lupus familiaris*)	Neighbouring properties, predation of stock	Asset protection	Strategic program	C-EC
Upper Hunter	Towarri National Park	Towarri National Park	Wild Dog (*Canis lupus familiaris*)	Neighbouring properties, predation of stock	Asset protection	Strategic program	C-EC
Upper Hunter	Towarri National Park	Towarri National Park	Feral Pig (*Sus scrofa*)	Environmental degradation, neighbouring properties	Asset protection	Reactive program	M-CP
Upper Hunter	Towarri National Park	Towarri National Park	Goat (*Capra hircus*)	Environmental degradation	Asset protection	Reactive program	Window
Upper Hunter	Wallabadah Nature Reserve	Wallabadah Nature Reserve	Wild Dog (*Canis lupus familiaris*)	Neighbouring properties, predation of stock	Asset protection	Strategic program	C-EC
Upper Hunter	Woolooma National Park	Woolooma National Park	Wild Dog (*Canis lupus familiaris*)	Neighbouring properties, predation of stock	Asset protection	Strategic program	C-EC
Upper Hunter	All Reserves	Upper Hunter Area	Deer (various species), Goat (*Capra hircus*), Feral Pig (*Sus scrofa*)	Environmental degradation, public safety	Asset protection	Monitor / aerial shoot/ Reactive Program	M-CP
Upper Hunter	All Reserves	Wild Dog Management Plans	Wild Dog (*Canis lupus familiaris*)	Neighbouring properties, predation of stock	Asset protection	Strategic program	C-EC
Upper Hunter	All Reserves	Upper Hunter Area	Goat (*Capra hircus*)	Environmental degradation	Asset protection	Reactive Program	C-EC
Upper Hunter	All Reserves	Upper Hunter Area	Rabbit *(Oryctolagus cuniculus)*	Environmental degradation, recreation sites	Asset protection	Reactive Program	M-CP
Upper Hunter	Barrington Tops State Conservation Area	Polblue Swamp complex Site 2	*Cytisus scoparius* (Scotch Broom)	Montane Peatlands and Swamps EEC, Broad-toothed Rat	Asset protection	Ground spray / Cut & Paint	C-TSC
Upper Hunter	Barrington Tops State Conservation Area	Polblue Swamp complex Site 1	*Cytisus scoparius* (Scotch Broom)	Montane Peatlands and Swamps EEC, Broad-toothed Rat	Asset protection	Ground spray / Cut & Paint	C-TSC

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of Control	Action	Priority
Upper Hunter	Barrington Tops State Conservation Area	Tubrabucca Falls	*Cytisus scoparius* (Scotch Broom)	Sub-alpine woodland, *Diuris venosa*	Asset protection	Ground spray	C-TSC
Upper Hunter	Barrington Tops State Conservation Area	Tubrabucca Flat	*Cytisus scoparius* (Scotch Broom)	Sub-alpine woodland, *Diuris venosa*	Asset protection	Ground spray	C-TSC
Upper Hunter	Barrington Tops National Park/State Conservation Area	Barrington Plateau	*Holcus lanatus* (Yorkshire Fog)	Montane Peatlands and Swamps EEC, Broad-toothed Rat	Asset protection	Monitor / Ground spray	C-TSC
Upper Hunter	Barrington Tops State Conservation Area	Barrington Plateau Roadsides and trails	*Leucanthemum vulgare* (Ox-eye daisy)	Montane Peatlands and Swamps EEC, Broad-toothed Rat	Asset protection	Monitor / Ground spray	C-NE
Upper Hunter	Barrington Tops National Park/State Conservation Area	Barrington Plateau	*Rubus fruticosus* agg. (Blackberry)	Reduce spread through reserve	Asset protection	Ground spray	L-PP
Upper Hunter	Barrington Tops State Conservation Area	Green Gap	*Pinus* species	Spread of wildlings threatening sub-alpine woodland, *Diuris venosa* habitat	Asset protection	Physical removal	M-RA
Upper Hunter	Barrington Tops National Park	Moonan Brook, Stewarts Brook, Meehans Peak Trail	*Ailanthus altissima* (Tree of Heaven)	Sub-alpine woodland, monitor and undertake control if required in previously treated area	Asset protection	Monitor	L-PP
Upper Hunter	Barrington Tops National Park	Wrights Trail area near bridge	*Carduus nutans* ssp. *nutans* (Nodding Thistle)	Reduce spread through reserve	Asset protection	Monitor / Ground spray	L-PP
Upper Hunter	Ben Halls Gap National Park	North western area	*Rubus fruticosus* agg. (Blackberry)	Maintain gains from weed control over previous years, limit incursions into Park from neighbouring properties NB Reserve relatively weed free apart from blackberry	Asset protection	Ground spray	L-PP
Upper Hunter	Ben Halls Gap National Park	Shirley Berry Block	*Rubus fruticosus* agg. (Blackberry)	Reduce spread through reserve NB Reserve relatively weed free apart from blackberry	Asset protection	Ground spray	L-PP
Upper Hunter	Brushy Hill Nature Reserve	Low land areas near the limestone kiln	*Opuntia* spp. (Pear species), *Lycium ferocissimum* (Boxthorn), *Ricinus communis* (Castor Oil Plant), *Datura stramonium* (Thorn Apple), *Conium maculatum* (Hemlock), Thistle species	Cultural Heritage sites, Woodland areas	Asset protection	Ground spray / Cut & Paint	M-RA

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of Control	Action	Priority
Upper Hunter	Burning Mountain Nature Reserve	Walking track and surrounds	*Opuntia* spp. (Pear species), *Heliotropium amplexicaule* (Blue heliotrope)	Box-Gum Woodland EEC Pear species hazardous to visitors	Containment	Physical removal	C-HD
Upper Hunter	Burning Mountain Nature Reserve	New England highway, reserve entrance	*Hyparrhenia hirta* (Coolatai Grass)	Box-Gum Woodland EEC Reduce spread into/through reserve, monitor infestations and liaise with other agencies regarding control	Asset protection	Monitor / Ground spray	C-NE
Upper Hunter	Burning Mountain Nature Reserve	Burning Head	*Hypericum perforatum* (St John's Wort)	Protect cultural heritage site and recreational values of the Burning Head Liaise with neighbours with off-park infestations	Asset protection	Ground spray	M-CP
Upper Hunter	Camerons Gorge Nature Reserve/State Conservation Area	Pages River Gorge	*Cylindropuntia imbricata* (Rope Pear)	Reduce spread through reserve	Asset protection	Ground spray / Cut & Paint	L-PP
Upper Hunter	Camerons Gorge Nature Reserve/State Conservation Area	Pages River Flats	*Echium plantagineum* **(**Paterson's Curse)	Riverine communities, catchment protection	Asset protection	Ground spray	L-PP
Upper Hunter	Crawney Pass National Park	Along road, northwest boundary	*Hypericum perforatum* (St John's Wort)	Reduce spread through reserve	Asset protection	Ground spray	C-NE
Upper Hunter	Crawney Pass National Park	Creeklines, Ridge Track	*Rubus fruticosus* agg. (Blackberry)	Reduce spread through reserve	Asset protection	Ground spray	L-PP
Upper Hunter	Crawney Pass National Park	Southern Fall	*Pittosporum undulatum* (Sweet Pittosporum)	Assess population and vegetation changes	Asset protection	Monitor	Window
Upper Hunter	Curracabundi National Park	Kalungra	*Rubus fruticosus* agg. (Blackberry)	Box-Gum Woodland EEC	Asset protection	Ground spray	C-TSC
Upper Hunter	Curracabundi National Park	Kalungra	*Ailanthus altissima* (Tree of Heaven), *Vinca major* (Blue Periwinkle), *Echium plantagineum* **(**Paterson's Curse)	Reduce spread through reserve; reduce spread down Manning River catchment	Asset protection	Ground spray / physical removal	L-PP
Upper Hunter	Murrurundi Pass National Park	Park Entrance	*Hyparrhenia hirta* (Coolatai Grass)	Reduce spread through reserve	Asset protection	Monitor / Ground spray	C-NE
Upper Hunter	Murrurundi Pass National Park	Two creeklines	*Ailanthus altissima* (Tree of Heaven)	Reduce spread through reserve	Eradication	Physical removal	L-PP
Upper Hunter	Murrurundi Pass National Park	Cleared Area	*Echium plantagineum* **(**Paterson's Curse), *Heliotropium amplexicaule* (Blue heliotrope)	Reduce spread through reserve	Asset protection	Ground spray	L-PP
Upper Hunter	Murrurundi Pass National Park	Cleared Area	*Rubus fruticosus* agg. (Blackberry), *Hypericum perforatum* (St John's Wort)	Reduce spread through reserve	Asset protection	Ground spray	L-PP

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of Control	Action	Priority
Upper Hunter	Murrurundi Pass National Park	Murrurundi Pass National Park	*Pittosporum undulatum* (Sweet Pittosporum)	Assess population and vegetation changes	Asset protection	Monitor	Window
Upper Hunter	Scone Mountain National Park	Weed Management Plan	Weed Management Plan	Hunter Valley Vine Thicket EEC	Asset protection	Develop weed management strategy	C-TSC
Upper Hunter	Scone Mountain National Park	Vine thickets - Noblet Road	*Asparagus asparagoides* (Bridal Creeper), *Opuntia* spp. (Pear species)	Hunter Valley Vine Thicket EEC	Asset protection	Ground spray / Cut & Paint	C-TSC
Upper Hunter	Towarri National Park	South of Liverpool range (Pages River Catchment)	*Rubus fruticosus* agg. (Blackberry)	Box-Gum Woodland EEC	Asset protection	Ground spray	C-TSC
Upper Hunter	Towarri National Park	Dry Creek	*Lantana camara*	Reduce spread through reserve	Containment	Ground spray	C-NE
Upper Hunter	Towarri National Park	Homestead Ruins	*Vinca major* (Blue Periwinkle), *Ulex europaeus* (Gorse), *Olea* spp. (Olives)	Reduce spread through reserve	Asset protection	Ground spray	C-NE
Upper Hunter	Towarri National Park	Middlebrook, particularly northern end	*Asparagus asparagoides* (Bridal Creeper)	Box-Gum Woodland EEC, monitor and control in previously treated area	Asset protection	Monitor	L-PP
Upper Hunter	Towarri National Park	Heaven Ridge Trail	*Ailanthus altissima* (Tree of Heaven)	Monitor and undertake control as required	Asset protection	Monitor	L-PP
Upper Hunter	Towarri National Park	Middlebrook	*Ligustrum* species (Privet),	Riparian vegetation, warm temperate rainforest (regional significance)	Asset protection	Ground spray	L-PP
Upper Hunter	Towarri National Park	Trails	*Opuntia stricta* (Prickly Pear), *Xanthium* species (Burrs)	Riparian vegetation, warm temperate rainforest (regional significance)	Asset protection	Ground spray	L-PP
Upper Hunter	Towarri National Park	Tarrayarra	Bushland weeds	Box-Gum Woodland EEC, north facing rainforests	Asset protection	Ground spray	L-PP
Upper Hunter	Wallabadah Nature Reserve	Creekline, northern fenceline	*Rubus fruticosus* agg. (Blackberry)	Reduce spread through reserve	Asset protection	Ground spray	L-PP
Upper Hunter	Wallabadah National Park	Wallabadah National Park	*Hypericum perforatum* (St John's Wort)	Reduce spread through reserve	Asset protection	Ground spray	L-PP
Upper Hunter	Wingen Maid Nature Reserve	Dry Creek	*Ailanthus altissima* (Tree of Heaven)	Box-Gum Woodland EEC, monitor and control in previously treated area	Asset protection	Monitor	L-PP
Upper Hunter	All Reserves	All Reserves	All Pear species	Various	Asset protection	Ground spray	M-RA
Hunter Region	All Reserves	All Reserves	BMAD	Eucalypt forests and woodlands, EECs Action: where appropriate - chemical foliar spraying; physical/mechanical removal; fire	Containment and/or asset protection	Monitor	C-NE
Hunter Region	All Reserves	All Reserves	Myrtle Rust	N/A - containment rather than asset management	Containment	Monitor	C-NE
Hunter Region	All Reserves	All Reserves	*Phytophthora cinnamomi*	Various plants, habitats and threatened species	Containment	Monitor	C-NE

6. Consultation

The Hunter Region Regional Pest Management Strategy was developed through consultation with the community and NPWS staff. A Pest Management Strategy Stakeholder Forum was conducted at Raymond Terrace on 26th August 2011. A diverse range of community representatives were represented including members of local Councils, Livestock Health and Pest Authorities, NSW Farmers Association, contract bush regeneration teams and several other stakeholder groups. Some of the key issues raised from this forum were:

- the need for strategic operational planning, particularly with emerging pest issues and new incursions (refer to Goal 1 Objective 1.1 in Part A);
- the need for communication, education and coordination of stakeholders (refer to Goal 3 Objective 3.2 in Part A);
- the requirement for cooperation and landscape scale pest management programs (refer to Goal 2 Objective 2.2 in Part A);
- the need for appropriate and long term resources to be available for pest management programs (refer to Goal 3 Objective 3.1 in Part A);
- the opportunity for capacity building and use of best practice (refer to Goal 1 Objective 1.1; Goal 2 Objective 2.2 in Part A);
- the need for monitoring, evaluation and reporting of pest programs (refer to Goal 3 Objective 3.41 in Part A); and
- the development of staff, communities and volunteers skills in order to build the capacity of NPWS to identify and treat pests (refer to Goal 3 Objective 3.3 in Part A).

Workshops were conducted with each operational Area with key ranger and field staff in order to accurately identify and prioritise pest management programs. Following the preparation of the draft Regional Pest Management Strategy, the document is now on public exhibition and comments are 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.

Fauna

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

Flora

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/

Key Threatening Processes

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

Plant Pathogen (*Phytophthora cinnamomi*)

http://www.environment.gov.au/biodiversity/threatened/publications/tap/phytophthora.html

http://www.environment.nsw.gov.au/resources/threatenedspecies/08119soipc.pdf

Amphibian chytrid fungus (*Batrachochytrium dendrobatidis*)
http://www.environment.nsw.gov.au/resources/threatenedspecies/09479soi2chytrid.pdf

http://www.environment.nsw.gov.au/resources/nature/hyprfrog.pdf

Wild Dog (*Canis lupus spp.*) for Hunter Region

Distribution and abundance

Wild dogs are distributed throughout the Hunter Region (exclusive of the offshore islands). While populations occur within reserves managed by NPWS, they are distributed across the landscape within all land tenures. Wild dog issues associated with stock predation are an ongoing issue for all land managers within the region.

Impacts

Wild dogs can cause substantial losses to livestock enterprises, especially sheep and cattle grazing operations. These impacts occur primarily in the northern and western areas of the region where forested areas adjoin grazing land.

The impacts of wild dogs on native species appear to be greatest on large mammals, such as kangaroos, swamp wallabies and large ground-dwelling birds. Wild dogs are considered to suppress populations of feral goats, pigs and foxes, although quantitative evidence of this is limited.

Predation by wild dogs may have negative impacts on some threatened species. In the Port Stephens area wild dogs have been associated with impacts on the koala population.

Management Objectives

To be effective, all wild dog control programs require a landscape approach in their implementation, including cooperation with neighbours and other land management agencies. Cooperative wild dog programs are generally undertaken on an annual basis with reactive programs implemented as identified through ongoing communication with neighbours and the LHPA. Wild dog control programs are undertaken as identified in Wild Dog Management Plans.

Control Priorities

- Cooperative annual and reactive baiting programs will continue to be implemented in Barrington Tops, Ben Halls Gap, Biriwal-Bulga, Crawney Pass, Curracabundi, Murrurundi Pass, Myall Lakes and Towarri national parks, Barrington Tops, Camerons Gorge and Curracabundi state conservation areas, and Back River, Camerons Gorge, Tomalla, Wallabadah and Woolooma nature reserves.
- Annual baiting programs will be undertaken within Karuah and Wallaroo nature reserves, and Medowie State Conservation Area as coordinated by the Port Stephens Feral Animal Committee and LHPA to minimize impacts on koala populations.
- Reactive programs will be undertaken in all other reserves as required.

Control Techniques

Integrated control programs will be used to manage wild dog issues in Hunter Region.

Strategic control programs will include:

- Aerial baiting in the more rugged inaccessible areas where other control techniques may not be cost-effective.
- Ground baiting, trapping and M44 ejectors in accessible areas.

Reactive control in response to reports of livestock predation or dog activity will include ground baiting, trapping and use of dog trappers.

Control methods include the delivery of 1080 (sodium monofluoroacetate) baits, either through aerial application, buried or M44 ejectors, trapping, shooting and exclusion fencing.

Monitoring

All ground baiting control and aerial baiting flight runs are recorded and data is maintained.

Effectiveness of programs in areas which receive monthly stock loss reports (Mid-coast and New England LHPA) for adjoining lands will be gauged by assessing stock loss records.

Red Fox (*Vulpes vulpes*) for Hunter Region

Distribution and Abundance

Foxes occur in most environments in Australia. However, they tend to be more abundant within landscapes with a mosaic of native vegetation and agricultural areas due to the presence of abundant food, cover and den sites. In contrast, foxes appear to be rare in closed forest distant from cleared land. Foxes occur throughout the Hunter Region, excluding the offshore islands.

Impacts

Predation by red foxes is listed as a KTP under the *TSC Act*. The introduction of foxes into Australia has had a devastating impact on native fauna, particularly among small to medium-sized (450-5000g) ground-dwelling and semi-arboreal mammals, ground-nesting birds and freshwater turtles. Recent studies have shown that predation by foxes continues to suppress remnant populations of many such species. Foxes have also caused the failure of several attempts to reintroduce native fauna into areas of their former range.

Foxes are also significant predators of domestic stock including lambs and poultry with predation by foxes having the potential to reduce lambing rates significantly. Impacts from foxes on lambing have been identified in the Upper Hunter adjoining Towarri National Park.

The priority native species and populations identified in the NSW Fox TAP occurring in Hunter Region include the endangered population of broad-toothed rat in Barrington Tops National Park and State Conservation Area, brush-tailed rock wallaby in Curracabundi and Woko National Parks and beach nesting shorebirds in the Manning Estuary.

In addition, beach nesting shorebirds in the Worimi Conservation Lands and bush stone-curlews in the Port Stephens area have been identified as an ongoing concern for future inclusion in the TAP as priority sites.

Management Objectives

Implement programs identified in the NSW Fox TAP or as part of cooperative programs with neighbours where fox predation on domestic stock is identified.

Control Priorities

- The broad-toothed rat, brush-tailed rock wallaby and beach nesting shorebird populations have been identified as priority sites in the NSW Fox TAP.
- Other cooperative fox control programs undertaken as required.

Control Techniques

Biannual baiting is implemented at Barrington Tops plateau for the protection of the broad-toothed rat populations and in Curracabundi National Park for the protection of bush-tailed rock wallaby populations. For the Manning Estuary, fox control is implemented annually before and during the nesting season for shorebirds.

A combination of control methods, including ground baiting using 1080, M44 ejectors, trapping, shooting and den fumigation, are used in control programs.

Monitoring

All treatment will be recorded and information maintained.

The impact of fox predation on the broad-toothed rat, brush-tailed rock wallaby and shorebird populations and conversely, the effectiveness of the control program are being assessed through long-term monitoring. Broad-toothed rat populations are

being monitored annually to understand distribution and age class structure. Brush-tailed rock wallaby are being monitored by pellet counts at fixed locations. For both of these programs, fox and other medium-sized mammal populations are being estimated biannually using either track counts on sandpads (Curracabundi National Park) or remote cameras (Barrington Tops National Park). Numbers of nesting shorebirds and fledgling bird success are monitored annually for the Shorebird site. Data is analysed by the Pest Management Unit and published periodically as part of the review of the Fox TAP.

Feral Pig (*Sus scrofa*) for Hunter Region

Distribution and abundance

Within Hunter Region, higher densities of feral pigs tend to occur in the plateau area of Barrington Tops National Park and State Conservation Area, and in Towarri National Park. Pig populations at lower densities are also found in other reserves including Barakee, Ben Halls Gap, Curracabundi and Woko national parks, and Back River, Tomalla and Woolooma nature reserves. Isolated individuals have been observed in Crawney Pass, Myall Lakes and Murrurundi Pass national parks, and Karuah, The Glen, Wallabadah and Wingen Maid nature reserves.

Impacts

Predation, habitat degradation, competition and disease transmission by feral pigs is listed as a KTP under the Commonwealth *EPBC Act* and NSW *TSC Act*.

Feral pigs use a wide range of habitats. They can cause environmental damage by selective feeding on plant communities, creation of drainage channels in swamps, soil erosion, fouling of watering points by their habit of wallowing and rooting (Hone 2002) and are an agent in the spread of weeds such as scotch broom (Parsons and Cuthbertson 1989).

In the sub-alpine wetlands of Barrington Tops and Ben Halls Gap national parks pigs cause damage to a number of threatened species and endangered ecological communities by their behaviour and feeding habits (Heinrich and Dowling 2000).

Management Objectives

To be effective, all pig control program should be implemented with a landscape approach, including cooperation with neighbours and other land management agencies. Implementation of programs in areas where threatened species and ecological communities are impacted upon and improve cooperative programs with neighbours where feral pigs impact on agriculture.

Control Priorities

- Feral pig programs to protect threatened species and endangered ecological communities in Barrington Tops National Park and State Conservation Area and Ben Halls Gap National Park.
- Cooperative feral pig control in Towarri and Curracabundi national parks.

Control Techniques

Current control programs utilise annual trapping and shooting programs supplemented by annual aerial shooting which is undertaken in coordination with neighbours. Other methods available include baiting, Judas collaring and exclusion fencing.

Monitoring

All control of feral pigs is recorded and information maintained. Information recorded for pigs trapped includes sex, weight, breeding or non- breeding.

Feral pig activity is monitored in permanent transects which have been established as part of recording long-term changes in native vegetation in the Barrington Tops National Park.

Rabbit (*Oryctolagus cuniculus*) for Hunter Region

Distribution and abundance

Rabbit populations are disjunct throughout the Hunter Region. In the urban coastal reserves rabbits persist on the edges utilising resources in neighbouring properties in Tomaree National Park and Worimi Conservation Lands. Isolated populations also occur in the Barrington Tops plateau, Curracabundi, Murrurundi Pass, Myall Lakes and Wallabadah national parks, and Burning Mountain Nature Reserve.

Vertebrate pest programs during the last decade have successfully eradicated rabbits, black rats and house mouse from the offshore islands of John Gould Nature Reserve and Broughton Island (part of Myall Lakes National Park). This has reduced the environmental degradation on these islands.

Impacts

Competition and grazing by the feral European rabbit is listed as a KTP under Commonwealth *EPBC Act* and NSW *TSC Act*.

Feral rabbits occupy a wide range of habitats, including native and modified grasslands, woodland, heath and forest. Rabbits adversely impact on native species due to competition for resources, alteration to the structure and composition of vegetation, and land degradation.

Feral rabbits are generally associated with minimal environmental impacts in Hunter Region. However, populations in the Barrington Tops plateau have the potential to compete for habitat with the endangered population of broad-toothed rat.

Management Objectives

Control programs will be implemented as part of threatened species habitat protection or as part of cooperative programs with neighbours.

Control Priorities

- Control programs in urban areas will be undertaken as part of cooperative programs with the Local Governments and the LHPA.
- Control programs will be implemented in areas where rabbit burrowing is causing damage to reserve infrastructure.

Control Techniques

Feral rabbit control uses a combination of techniques including baiting, fencing, fumigation, trapping, shooting, warren ripping and biological controls. The release of biocontrol agents is the preferred option for reducing rabbit populations on reserve boundaries with urban interfaces.

Monitoring

Rabbit distribution on the Barrington Tops plateau will be monitored annually as part of the broad-toothed rat population monitoring.

Feral Horse (*Equus caballus*) for Hunter Region

Distribution and Abundance

Feral horses occur on the plateau area of Barrington Tops National Park and State Conservation Area, Nerong area of Myall Lakes National Park, the Tuggalo and Kalungra areas of Curracabundi National Park and in Barakee National Park and State Conservation Area. Details on the abundance of these populations vary between each reserve and additional monitoring of populations is required.

Impacts

Feral horses cause significant damage to the natural environment (Drying 1990). They create frequently used paths which increase erosion and disturb and compact the soil. Feral horses destroy native plants by grazing, trampling and collapsing edges of swamps and wildlife burrows. They spread weeds in their dung and coat. On the Barrington Tops plateau feral horses are adversely impacting on threatened species, both flora and fauna, and endangered ecological communities.

Feral horses also threaten public safety as the animals are known to stray onto major roads including the Scone-Gloucester Road through Barrington Tops National Park and the Booral Road near Nerong. Stallions have also been observed demonstrating threatening and intimidating behaviour to staff and park users, presenting a public safety risk.

Management Objectives

Prepare and implement a feral horse management strategy for Barrington Tops, Barakee, and Curracabundi national parks. Continue implementation of Nerong Horse Management Strategy (DEC 2006b) in cooperation with Forests NSW and neighbours.

Control Priorities

Feral horse management in Barrington Tops National Park to reduce damage to threatened species and endangered ecological communities, and reduce the risk of aggressive and threatening behaviour to staff and park users. Management of feral horses in the Nerong area (Myall Lakes National Park) and particularly along the Scone-Gloucester Road (Barrington Tops National Park/State Conservation Area) to reduce risk to vehicular traffic.

Control Techniques

Current control programs utilise low stress stock handling techniques which are passive, humane and effective.

Monitoring

Monitor populations using remote sensing and surveillance techniques as appropriate to determine population size, growth, distribution and patterns of behaviour as appropriate.

Feral Goat (Capra hircus) for Hunter Region

Distribution and abundance

Feral goat populations are largely restricted to small disjunct populations which occur on both NPWS estate and private land. Scattered populations occur in Ben Halls Gap, Crowdy Bay, Curracabundi and Murrurundi Pass national parks, and Brushy Hill, Burning Mountain, Camerons Gorge, Khappinghat, Killarney, Mernot, Monkerai and Wallabadah nature reserves.

Impacts

Competition and habitat degradation by feral goats has been listed as a KTP under the Commonwealth *EPBC Act* and the NSW *TSC Act*.

In Hunter Region, goats compete with brush-tailed rock wallaby for habitat in Curracabundi National Park and graze on threatened plant species and endangered ecological communities within a range of reserves.

Grazing and browsing by feral goats has significant impacts on native vegetation. It can lead to changes in species composition as more palatable species are eaten and removed, as well as changes in vegetation structure. Areas with a high density of goats have a conspicuous browse line, as all foliage within their reach is consumed. Grazing can lead to a decrease in overall cover and an increase in bare ground, which, 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 adversely impacted by feral goats through competition for food and shelter.

Feral goats also cause damage to Aboriginal heritage sites, compete with neighbouring livestock and are potential vectors of livestock diseases.

Control Priorities

Biennial aerial shooting programs in Towarri Nature Reserve, extending to Wallabadah Nature Reserve and Crawney Pass and Ben Halls Gap national parks, if resources permit.

Control Techniques

Effective control of feral goats requires an integrated approach using several complementary control techniques. In Hunter Region the main control technique is aerial shooting. 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 Towarri National Park where migration is constant, aerial shooting programs will be conducted to maintain or reduce the current goat density.

Monitoring

Changes in the relative abundance of feral goats are assessed during each successive aerial shoot and trapping and mustering programs by comparing kills (cull rate compared from shoot to shoot) or captures per unit effort (time).

Feral Deer for Hunter Region

- *Cervus timorensis* (Rusa Deer)
- *Dama dama* (Fallow Deer)
- *Cervus elaphus* (Red Deer)

Distribution and Abundance

Feral rusa (*Cervus timorensis*), fallow (*Dama dama*) and red deer (*Cervus elaphus*) are known to occur within Hunter Region, including Brushy Hill, Camerons Gorge, Cedar Brush, Karuah, Wallabadah and Wallaroo nature reserves, Barrington Tops, Bugan, Crawney Pass, Khappinghat, Murrurundi Pass, Towarri and Wallingat national parks, and Camerons Gorge and Barrington Tops state conservation areas. In the past 4-5 years there has been an observable increase in the number of feral deer within a range of locations, particularly in the Upper Hunter Area.

Impacts

The herbivory and environmental degradation caused by feral deer has been listed as a KTP under the NSW *TSC Act*.

Feral deer impact on NPWS estate by destroying native plants through trampling, grazing and ring barking small trees, fouling watercourses, causing soil erosion, spreading weeds and their potential ability to transmit animal diseases to domestic livestock. They are known to impact on rural properties, by browsing on agricultural crops and damaging fences, and urban properties where they browse on garden plants. Feral deer can also pose threats to public safety when they stray onto roadways.

Management Objectives

Develop and implement feral deer control programs in coordination with neighbours where required.

Control Priorities

Assist neighbours, stakeholders and other government agencies in cooperative feral deer control programs as required.

Control Techniques

Control programs can include trapping or shooting. Trapping has very limited success in areas with high deer densities. Research trials to assess the effectiveness of poison baits for deer and goat are being undertaken in Upper Hunter Area reserves.

Monitoring

Improve knowledge of the distribution and abundance of feral deer populations and their impacts on reserves, particularly in Upper Hunter Area.

Management of feral deer populations in coordination with other stakeholders.

Feral Cat (*Felis catus*) for Hunter Region

Distribution and abundance

Feral cats are known to occur throughout most reserves in the Hunter Region except for the offshore islands. Due to their shy and elusive nature their abundance is unknown.

Impacts

Predation by feral cats has been listed as a KTP under the Commonwealth *EPBC Act* and the NSW *TSC Act*.

Feral cats are known to cause local impacts on populations of native species, particularly small mammals. Feral cats have been implicated as one of the causes in the decline of native species, particularly in the arid zone. They also act as a reservoir for infectious diseases such as toxoplasmosis and sarcosporidiosis which can be transmitted to native fauna, domestic stock and humans.

Management Objectives

Continue to monitor populations as part of a broader vertebrate pest monitoring program associated with the Fox TAP and management of EECs.

Undertake control as appropriate, particularly if a cost effective control technique is developed and approved.

Control Priorities

Undertake targeted control when required for areas where cat populations are likely to be directly impacting on threatened species.

Control Techniques

Control of feral cats is difficult due to their cryptic nature and preference for live prey.

Primary control methods include trapping and shooting. No pesticides are currently available for use on cats in NSW although there is ongoing work developing suitable bait palatable for cats.

Monitoring

Monitoring of key sites using surveillance cameras to estimate population size as appropriate.

All control will be recorded and information maintained.

Ageratina adenophora (Crofton Weed), *A. riparia* (Mistflower) for Hunter Region

Distribution and Abundance

Crofton weed (*Ageratina adenophora*) and mistflower (*A. riparia*) occur in isolated infestations throughout the region, generally east of the range. These weeds are common along road edges and gullies in wetter areas such as eastern Barrington Tops National Park, Curracabundi National Park, The Glen Nature Reserve, Ghin-Doo-Ee National Park, Watchimbark National Park, Wallis Lake Islands, central Myall Lakes National Park, most reserves in Manning Area and scattered across Broughton Island (part of Myall Lakes National Park).

Impacts

Crofton weed is poisonous to horses and is listed as a Control Class 4 noxious weed in the three coastal councils in the Hunter Region (Gloucester, Great Lakes and Greater Taree) (Appendix 2). Mistflower is Class 4 in Port Stephens LGA.

Both weeds spread rapidly in disturbed areas along roadside verges, out-competing native colonisers. Plants produce vast numbers of seed which are spread by wind and water, resulting in the establishment of plants along creeklines and cliff faces where no disturbance has occurred.

Mistflower smut (*Entyloma ageratinae)* biocontrol is being trialled along the Williams River in Barrington Tops National Park and creeklines in The Glen Nature Reserve.

Control Priorities

- Treat crofton weed and mistflower in identified Biodiversity Priorities for Widespread Weed (BPWW) sites.
- Crofton weed control is a priority in Curracabundi and Wallingat national parks and Watchimbark Nature Reserve, and mistflower control is ongoing in Black Bulga State Conservation Area and The Glen Nature Reserve.
- Crofton weed and mistflower control are undertaken as part of other multi-weed control programs.

Monitoring

All treatment will be recorded and information maintained.

Assist with monitoring of mistflower in Barrington Tops National Park and The Glen Nature Reserve.

Aquatic Weeds for Hunter Region

- *Eichhornia crassipes* (Water Hyacinth)
- *Myriophyllum aquaticum* (Parrots Feather)
- *Pistia stratiotes* (Water Lettuce)
- *Salvinia molesta* (Salvinia)

Distribution and Abundance

Water lettuce, salvinia and water hyacinth occur together in a former sand-mining impoundment in Crowdy Bay National Park. A salvinia infestation also occurs in the western part of Crowdy Bay National Park. Water hyacinth occurs in a small dam in Tilligerry State Conservation Area, adjacent to residential properties.

Scattered populations of parrots feather occur in the upper Myall River growing in freshwater wetlands of Myall Lakes National Park.

Infestations of salvinia, *Sagittaria platyphyla* (Sagittaria) and *Cabomba caroliniana* (Cabomba) currently not present on the park estate occur in the catchment of Myall Lakes. These species potentially threaten the significant biodiversity values of Ramsar wetlands of Myall Lakes National Park.

Impacts

Water hyacinth is a free-floating stoloniferous perennial up to one metre in height. Floating plants completely obstruct water movement and reduce oxygen levels in water (Lamp and Collet 1999). The noxious classification of water hyacinth in the LGAs of the Hunter Region varies from Control Class 2-4.

Salvinia is a free-floating aquatic fern which can form dense mats. Plants have central stems that lie beneath the water surface, pairs of hairy floating leaves along the stems and submerged trailing root-like filaments. Plants float together over the water surface and have three distinct growth stages. Reproduction is asexual (NSW DPI 2006). Salvinia infestations rapidly grow in high nutrient slow-moving water bodies. Salvinia is a Weed of National Significance (WONS) and varies from Class 2-3 in Hunter Region LGAs. Salvinia previously infested part of Myall Lakes National Park which is listed as a Ramsar wetland (NPWS 1999).

Water lettuce is a free-floating plant which spreads rapidly by producing numerous daughter plants attached by stolons. It reproduces by fragments and seed (I&I 2009). Water lettuce is a Control Class 1 noxious weed throughout NSW.

Parrots feather is a stoloniferous perennial. It grows in static or moving water up to 2 metres in depth, rooting in mud or gravel and spreads by stem fragments.

Management Objectives

Continue to implement removal/control of all aquatic weeds and assist in co-operative programs with landholders.

Record and map all aquatic weed infestations and treat any newly identified isolated infestations.

Control Priorities

- Ongoing control of aquatic species in the sand-mining impoundment in Crowdy Bay National Park. Treatment to date has been effective however will be required for many years due to seed longevity and on-going germination.
- Eradication of water hyacinth in Tilligerry State Conservation Area.

Control Techniques

Aquatic weed control is problematic due to the rapid growth of aquatic weeds and the impact dead and decaying material can have on the water quality of waterways.

- Water hyacinth - mechanical removal, herbicide (diquat or glyphosate), physical removal of isolated seedlings/plants.
- Salvinia - physical removal of isolated plants and herbicide control of dense mats.
- Water lettuce - mechanical removal, herbicide (diquat or glyphosate), physical removal of isolated seedlings/plants.
- Parrots feather - physical removal of isolated plants, removing all plant material. Herbicide control trials have been undertaken in the Great Lakes LGA.

Monitoring

- Map, record and store all occurrences of aquatic weeds on NPWS estate and monitor distribution in response to control.
- *Sagittaria platyphyla* (Sagittaria) and *Cabomba caroliniana* (Cabomba) infestations occur in waterways adjacent to the Myall Lakes and thus constant vigilance is required for incursions into the waterways of the Myall system.
- *Ad hoc* monitoring of waterways in Myall Lakes National Park for new incursions of any aquatic weeds and/or spread of parrots feather.

Regular liaison with the local control authorities, Great Lakes, Greater Taree, Port Stephens and Cessnock LGAs to identify any new incursions of aquatic weeds in the upper catchments.

Asparagus weeds for Hunter Region

- *Asparagus asparagoides* (Bridal Creeper)
- *A. aethiopicus* (Ground Asparagus*)*
- *A. plumosus* (Climbing Asparagus)

Distribution and Abundance

- Bridal creeper - isolated infestations in Camerons Gorge, Snapper Island and Wallis Lake islands nature reserves, and Scone Mountain, Tomaree, and Towarri national parks.
- Ground asparagus - dense infestations in Saltwater National Park; scattered infestations in Booti Booti, Crowdy Bay, Myall Lakes and Tomaree national parks and Darawank, Khappinghat and Wallis Lake islands nature reserves.
- Climbing asparagus - widespread infestations in Booti Booti National Park; isolated infestations in Curracabundi and Myall Lakes national parks and Tilligerry and Wallis Lake islands nature reserves.

All these species have the ability to increase their current range.

Impacts

- Bridal creeper is listed as a WONS largely due to its invasiveness, potential for spread and economic and environmental impacts. It is listed as a Class 4 noxious weed in all LGAs in the Hunter Region. It invades undisturbed environments where its climbing stems and foliage smother native plants and form thick dense mats (ARMC 2001).
- Ground asparagus mostly occurs in coastal reserves. The plant quickly establishes in both disturbed and undisturbed sites and competes with native ground cover species.
- Climbing asparagus occurs in coastal reserves adjacent to urban areas and at old homestead sites in inland reserves. The stems of the plant climb trees and trail along the ground creating dense mats and reducing regeneration of native species.

All these asparagus species produce fleshy fruit, readily distributed by birds.

Priorities for control

- Treat all *Asparagus* species in identified BPWW sites.
- Continue control programs targeting *Asparagus* species in The Glen Nature Reserve, Booti Booti, Myall Lakes and Saltwater national parks, and the homestead sites in Curracabundi National Park.

Control

Isolated infestations can be controlled by physical removal or the cut-and-paint or cut-and-scrape technique. Heavier infestations are initially controlled using herbicide applied by backpack sprayers or vehicle-based spray. Some infestations of bridal creeper may be suitable for the release of a biocontrol agent (bridal creeper rust fungus - *Puccinia myrsiphylli*).

Monitoring

All control will be recorded and information maintained.

Continue monitoring ground asparagus transects at Saltwater Headland in Saltwater National Park.

Chrysanthemoides monilifera ssp. *rotundata* (Bitou Bush) for Hunter Region

Distribution and Abundance

It is believed that bitou bush first established in the Hunter area, being brought into the Hunter estuary in ship's ballast. It was then used in post-mining vegetation rehabilitation and has since become a widespread weed on the NSW coastline.

Bitou bush mapping has been undertaken in all coastal reserves in the Hunter Region. Extensive infestations occur in Booti Booti, Crowdy Bay, Myall Lakes, Saltwater and Tomaree national parks, Corrie Island and Khappinghat nature reserves and Worimi Conservation Lands. Isolated infestations occur on offshore islands.

Impacts

Bitou bush is a WONS and is declared a Control Class 4 noxious weed in all 3 coastal councils in the Hunter Region (Great Lakes, Greater Taree and Port Stephens LGAs). The invasion of native plant communities by bitou bush is listed as a KTP under the NSW *TSC Act* and a TAP (DEC 2006a) has been successfully implemented for the past 5 years. The Bitou Bush TAP is currently under review.

Bitou bush is a highly competitive weed that smothers native plant communities and destroys natural habitat and food sources for native animals. It threatens over 180 native plant species, populations and ecological communities in NSW. Bitou bush invades dunes, coastal heathlands, grasslands, woodlands and forests. It infests almost the entire coastline in the Hunter Region.

Management Objectives

Bitou bush programs focus on the treatment of isolated infestations (to reduce the weeds distribution), cultural heritage sites and in areas which have threatened species or endangered ecological communities (DEC 2006a). A strategic management plan for control of bitou bush and other weeds will be developed and implemented for Worimi Conservation Lands.

Over the past 2-3 years, there has been an extensive strategic and co-operative cross-tenure bitou bush control program undertaken in Great Lakes Area, employing aerial and ground-based spraying techniques. This program has controlled widespread primary infestations of bitou bush, reducing the impacts of this weed across the entire coastline.

Priorities for Control

The Bitou Bush TAP (DEC 2006a) identifies priority sites for control in the Hunter Region. Site management plans have been prepared for these sites and also include the treatment of a number of other weed species. Bitou bush control programs have been undertaken, and continue, in many of these sites including:

- Tomaree National Park - Tomaree Headland, Fishermans Bay, Anna Bay Headland, Wreck and Box Beaches
- Myall Lakes National Park - most beaches and headlands
- Booti Booti National Park - most beaches and headlands
- Darawank Nature Reserve - Seven Mile Beach
- Crowdy Bay National Park - Harrington - Crowdy Head Road
- Saltwater National Park/Khappinghat National Park - Wallabi Point Headland

Other control priorities include the treatment of isolated infestations on John Gould Nature Reserve (Cabbage Tree Island), Broughton Island in Myall Lakes National Park and Boondelbah Island Nature Reserve.

Control Techniques

Bitou bush is controlled using an integrated approach. A number of different techniques are utilised including physical removal, cut-and-paint technique and herbicide treatment from backpack, vehicle, and boom and spot-application from helicopter. Three biocontrol agents, Leaf Rolling Moth (*Tortrix* sp.), Tip Moth (*Comostolopsis germana*) and Seed Fly (*Mesoclanis polana*) have also effectively established in all coastal reserves. NPWS has an off-label permit for the aerial application of herbicide.

Monitoring

The region will continue to monitor the success of the bitou bush control programs at sites in Tomaree, Khappinghat and Myall Lakes national parks using methods outlined in the Bitou Bush TAP monitoring guidelines. Information will be collected annually from permanent transects, including density and abundance of bitou bush and native species present. All treatment of bitou bush will be recorded and information maintained.

A permanent monitoring site has been established in Tomaree National Park with the Pest Management Unit (Head Office) to further understand the demography of bitou bush invasion and native plant rehabilitation following control.

Cytisus scoparius (Scotch Broom) for Hunter Region

Distribution and Abundance

Scotch broom infests in excess of 10,000 hectares of the sub-alpine plateau in Barrington Tops National Park and State Conservation Area.

Impacts

Scotch broom is a KTP under the *TSC Act*.

Scotch broom is an aggressive invader in areas of high fertility soils and open canopy. It is competitive with native species inhibiting regeneration and growth. The weed has become established in woodlands and open forest (Hosking *et al.* 1998). Scotch broom is also invading the wetlands and open grasslands of the Barrington Tops plateau (NPWS 2001).

The Barrington Tops plateau has a large number of endemic plant species including six threatened species and the montane peatlands and swamps endangered ecological community. Scotch broom also provides unsuitable habitat for a number of threatened mammal populations including the endangered populations of the broad-toothed rat.

Management Objectives

A Scotch Broom Containment Strategy has been prepared and implemented since 1998 (NPWS 2001). The containment strategy aims to:

- treat isolated infestations outside the containment boundaries,
- prevent the infestation of unaffected catchments,
- minimise the spread along trails, and
- treat scotch broom within the main infestation in areas identified as high ecological priority.

Control Priorities

- Removal of all plants within the sub-alpine wetlands including Polblue, Little Murray and Edwards Swamps.
- Biannual treatment of isolated infestations in the Moppy Catchment.
- Expansion of the containment strategy to include biannual treatment of the areas east of the Barrington Trail (North).
- Annual monitoring of Gloucester Tops and biannual monitoring of the Link Trail.
- Biannual treatment of various trails within the infestation as outlined in the Scotch Broom Containment Strategy.

Control Techniques

A combination of physical removal of seedlings and cut-and-paint technique are utilised for isolated infestations in and around sub-alpine wetlands. Other areas are treated with herbicide applied from vehicle-mounted spray units.

Four biological control agents have been released including a Twig Mining Moth (*Leucoptera spartifoliella*), Plant Louse (*Arytainilla spartiophila*), Seed Feeding Beetle (*Bruchidius vilosus*) and Broom gall mite (*Aceria genistae*). A rust fungus (*Uromyces genistae*) has also established.

Monitoring

All treatment will be recorded and information maintained.

Mapping of the distribution and abundance was undertaken in 1989, 1999 and 2009. This information indicates the effectiveness of containment over a ten year period

(Odom *et al*, 2003) and is used to review and update the Scotch Broom Containment Strategy. The next review and mapping event will be due in 2018-19.

Other monitoring is being undertaken by universities and research agencies in discussion with NPWS as appropriate.

Coastal Environmental Weeds (including Beach Herbs) for Hunter Region

- *Baccharis halimifolia* (Groundsel Bush)
- *Cinnamomum camphora* (Camphor Laurel)
- *Erythrina* species (Coral Tree)
- *Juncus acutus* (Sharp Rush)
- *Lilium formosanum* (Formosa Lily)
- *Polygala myrtifolia* (Polygala)
- *Senna pendula* (Senna)

Distribution and Abundance

Groundsel bush infestations are restricted to inaccessible land in south western Crowdy Bay National Park; however a more extensive infestation is in the adjacent private property. Camphor laurel is widespread in Towibakh Nature Reserve. Isolated groupings of coral trees are located in a number of coastal reserves, many associated with prior landuse. *Juncus acutus* is present in Khappinghat Nature Reserve, Tilligerry State Conservation Area and Worimi National Park. Formosan lily is most common in reserves of Manning Area and has been recorded in Booti Booti National Park. One isolated infestation previously recorded (and treated) in The Glen Nature Reserve was likely a result of garden dumping. Polygala has been controlled for many years; however occasionally it reappears in Tomaree National Park. A dense polygala infestation occurs on One Tree Island Nature Reserve. Senna is widespread in most coastal reserves, with heaviest infestations found in the Great Lakes and Manning Areas.

Arctotheca populifolia (Beach Daisy), *Cakile edentula* (Sea Rocket), *Crithmum maritimum*, *Eryngium maritimum* (Sea Holly) and *Hydrocotyle bonariensis* (Penny Wort) are present along many of the dunal systems in Booti Booti, Myall Lakes and Tomaree national parks and Worimi Conservation Lands. Control of these species will be undertaken as part of other multi-weed control programs, or they may be left uncontrolled if they are growing in the storm-zone of instable dune systems.

Impacts

Coastal environmental weeds invade native plant communities often in association with other weeds already widely distributed such as bitou bush or lantana. Many of these species are grown in urban gardens and seed is distributed into bushland reserves by birds or through refuse dumping. At some sites these weed species are secondary invaders, such as Senna, following the removal of the primary weed invasion. Many of these secondary weed invaders are more difficult, and thus more expensive, to control than the primary weeds. They also reduce the ability of native vegetation communities to recover (Buchanan 1994).

Management Objectives

Control of these species will be undertaken as part of other multi-weed control programs. New weed incursions, which have not been previously recorded and are known to be a problem, are treated as a priority.

Priority Control

- Treat all coastal environmental weeds in identified BPWW sites.
- Treat groundsel bush in Crowdy Bay National Park in collaboration with adjoining landowner and Greater Taree City Council.
- Investigate extent of *Juncus acutus* infestation in Khappinghat National Park.

- Undertake removal of isolated coral trees in Crowdy Bay, Myall Lakes and Wallaroo national parks, Khappinghat Nature Reserve and Worimi National Park and Regional Park.
- Continue control of polygala in Tomaree National Park; investigate extent of infestation and possibility of control of polygala on One Tree Island Nature Reserve.

Monitoring

All treatment of coastal environmental weeds will be recorded and information maintained. New weed incursions will be mapped.

Exotic Herbs for Hunter Region

- *Asystasia gangetica* ssp*. micrantha* (Chinese Violet)
- *Bryophyllum delagoense* (Mother-of-Millions)
- *Echium plantagineum* (Paterson's curse)
- *Galenia pubescens* (Galenia)
- *Heliotropium amplexicaule* (Blue Heliotrope)
- *Hypericum perforatum* (St John's Wort)
- *Leucanthemum vulgare* (Ox-eye Daisy)
- *Xanthium* species (Burrs)
- *Watsonia meriana* var*. bulbilifera* (Wild Watsonia)

Distribution and Abundance

Chinese violet is located in and adjacent to Tomaree National Park at Boat Harbour and One Mile Beach, and isolated plants occur in Tilligerry State Conservation Area.

Mother-of-millions is scattered in a few coastal reserves.

Paterson's curse, galenia and blue heliotrope are all widespread in Scone Mountain National Park.

Galenia is restricted to Brushy Hill Nature Reserve and Towarri National Park.

Scattered populations of blue heliotrope occur in Murrurundi Pass National Park and Burning Mountain Nature Reserve.

St John's Wort occurs as an isolated infestation in Curracabundi National Park, with more widespread infestations in Burning Mountain and Camerons Gorge nature reserves, and Crawney Pass, Murrurundi Pass, Scone Mountain and Wallabadah national parks. These reserves all adjoin lands which have infestations.

Ox-eye daisy is found along roads and trails in Barrington Tops National Park/State Conservation Area, with isolated plants along some trails in The Glen Nature Reserve.

Burrs occur in a number of reserves throughout the region including Curracabundi, Myall Lakes, Scone Mountain, Towarri, Watchimbark and Woko national parks, and Worimi Conservation Lands. It occurs most frequently along recently disturbed tracks and trails.

Wild Watsonia occurs in Booti Booti and Myall Lakes national parks.

Impacts

Chinese violet is a Control Class 1 noxious weed. A herbaceous scrambling perennial plant, it competes strongly for space, water and nutrients and has rapidly colonised coastal areas in the Port Stephens area.

Mother-of-millions is confined to isolated minor infestations and has minimal impact on native plant communities however it is poisonous to stock.

Paterson's curse is a Class 4 noxious weed in most LGAs of Hunter Region. It can be a very competitive and dominant species in a range of habitats and contains toxins that can be poisonous to livestock.

Galenia has the potential to smother plants and prevent germination of other species. There is a concentration of Galenia in the Hunter Valley where it has been used as a stabilizing species for coal mining areas. It is a Class 4 noxious weed in Liverpool Plains and Tamworth LGAs.

Ox-eye daisy may grow so densely that most other vegetation is excluded, and consequently it may seriously threaten the integrity of native vegetation. It has the potential to establish in open forests of the Barrington Tops plateau.

Burrs, blue heliotrope and St John's wort are largely a result of the past agricultural landuse of many of the Upper Hunter Area reserves. All of these species compete with native species during regeneration and can impact on agriculture production. St John's wort causes photosensitivity in cattle and the fruit from burrs can affect wool production. St John's wort is a Class 3-4 noxious weed in the LGAs of the Hunter Region.

Wild watsonia, a garden escape, has become a major environmental weed of disturbed bushland and roadsides, particularly near water. The production of very large numbers of bulbs makes control difficult.

Management Objectives

Target and treat isolated infestations of weeds which are known to be problematic in similar environments. Focus control programs on infestations recognised in BPWW and also in the upper catchments as a priority. Work with neighbours to implement a landscape approach to the management of agricultural weeds.

A strategic management plan for control of all environmental weeds in Scone Mountain National Park will be developed.

Control Priorities

- Treat all exotic herbs identified in BPWW.
- Identify and treat Chinese violet in Tomaree National Park in coordination with Port Stephens LGA.
- Treat isolated infestations of St John's wort in Curracabundi National Park.
- Identify and contain new incursions outside known locations.

Other weed control programs for exotic herbs should only be undertaken across the landscape as part of cooperative programs with all neighbours.

Management Objectives

All treatment of exotic herbs will be recorded and information maintained.

Exotic and Pasture Grasses for Hunter Region

- ***Andropogon virginicus* (Whisky Grass)**
- ***Cortaderia* spp. (Pampas Grass)**
- ***Holcus lanatus* (Yorkshire Fog)**
- ***Hyparrhenia hirta* (Coolatai Grass)**
- ***Pennisetum clandestinum* (Kikuyu)**
- ***Paspalum* spp. (Broad-leaved Paspalum)**
- ***Sporobolus fertilis* (Giant Parramatta Grass)**
- ***Stenotaphrum secundatum* (Buffalo Grass)**

Distribution and Abundance

Exotic perennial grasses occur in all reserves throughout the region. The above list is not comprehensive; however it identifies those grasses that are likely to have the greatest impact or are already widely established. Whisky grass occurs throughout most coastal reserves but is confined to roadside edges or disturbed areas. Pampas grass infestations are scattered throughout the hinddunes of Worimi Conservation Lands and there is an isolated infestation in an old dredge site on Wallis Island Nature Reserve. Yorkshire fog is widespread across the sub-alpine plateau displacing native species along roadsides and along the creek lines at Polblue and Nolans Swamp in Barrington Tops National Park and State Conservation Area. Coolatai grass has established in Murrurundi Pass National Park and occurs outside Burning Mountain Nature Reserve. It has potential to spread significantly beyond its current locations. Broad-leaved paspalum occurs in many reserves, and is particularly common in Myall Lakes National Park. Giant Parramatta grass is widespread across all reserves in the Region. Buffalo grass and kikuyu infestations are problematic in many of coastal reserves and littoral rainforest sites in Booti Booti, Khappinghat and Tomaree national parks. Buffalo grass is widely established on parts of Broughton Island.

Impacts

Invasion of native plant communities by exotic perennial grasses have been listed as a KTP as part of the *TSC Act*. Exotic perennial grasses are characterised by vigorous growth and prolific seed production which in some places displace native vegetation. They may also change the bushfire fuel loads in plant communities. The changed structure and fire regimes of the habitat adversely impact on both native vertebrate and invertebrate fauna (DECC 2007a). In the Barrington Tops plateau, Yorkshire fog threatens the Endangered Ecological Community listed Montane Peatlands, habitat for the endangered broad-toothed rat and a number of other threatened plant species.

Management Objectives

Focus control programs on infestations identified in BPWW.

Ensure hygiene protocols are enforced, especially cleaning of vehicles, heavy plant and machinery.

Control Priorities

- Treat infestations identified in BPWW.
- Identify, locate and treat any new weed incursions where they impact on threatened species or endangered ecological communities.
- Treat pampas grass infestations in Worimi Conservation Lands.
- Prevent the establishment of Yorkshire Fog in the Edwards Swamp catchment on the sub-alpine plateau of Barrington Tops National Park.

- Treat isolated infestations of all exotic grasses to reduce spread through reserves and neighbouring properties.

Control Techniques

A variety of control techniques can be utilised for controlling grasses, including physical removal of isolated clumps or herbicide spot-spraying, from a vehicle-mounted spray unit or ‘rope wick’ applicators. The risk of using herbicides is the potential impact to native grasses. The creation of bare patches following herbicide application allows exotic grasses to rapidly re-establish. Follow-up is critical in the control of exotic grasses.

Monitoring

All treatment of exotic grasses will be recorded and information maintained.

Exotic Vines and Scramblers for Hunter Region

- ***Anredera cordifolia*** **(Madeira Vine)**
- ***Araujia sericifera*** **(Moth Vine)**
- ***Delairea odorata*** **(Cape Ivy)**
- ***Dipogon lignosus*** **(Dolichos Pea)**
- ***Gloriosa superba*** **(Glory Lily)**
- ***Ipomoea cairica*** **(Coastal Morning Glory)**
- ***Ipomoea indica*** **(Blue Morning Glory)**
- ***Passiflora subpeltata*** **(White Passionfruit)**
- ***Thunbergia alata*** **(Black-eyed Susan)**
- ***Tradescantia fluminensis*** **(Wandering Jew)**

Distribution and Abundance

Madeira vine infestations are widespread on Coocumbac Island and Lansdowne nature reserves, Watchimbark Nature Reserve and Curracabundi National Park and State Conservation Area. Minor infestations occur in other reserves.

Moth vine is present in reserves across the region except Upper Hunter Area. Dense infestations grow along Watchimbark Creek in Watchimbark Nature Reserve.

Dolichos pea is restricted to Tomaree National Park, Worimi Conservation Lands and Broughton Island (Myall Lakes National Park).

Glory lily is present on lands adjacent to Darawank Nature Reserve and Khappinghat National Park; however, pending further investigations, at this stage it is not recorded on park.

Major infestations of both morning glory species occur on Coocumbac Island Nature Reserve and the offshore islands of Broughton, Boondelbah and John Gould nature reserves. Scattered infestations occur in many of the coastal reserves.

White passionfruit is widespread in Booti Booti National Park, Snapper Island and Yahoo nature reserves.

Black-eyed Susan occurs as isolated infestations in Copeland Tops State Conservation Area, Monkerai Nature Reserve, and Booti Booti and Myall Lakes national parks.

Wandering Jew infestations are limited to rainforest locations, mostly along the coastal fringe, and is particularly widespread in Coocumbac Island Nature Reserve.

Impacts

Exotic vines and scramblers have been identified as a KTP as part of the *TSC Act*.

Cape ivy, madeira vine, moth vine and morning glory are all vines that smother the ground and canopy of riparian and rainforest vegetation, altering light availability and suppressing the growth and regeneration of native species. The weight of these vines may also cause breakages and canopy collapse (DECC 2007b).

Dolichos pea impacts on coastal vegetation communities where it smothers vegetation and reduces native germination.

Glory lily is a scrambler or climber up to two metres in height which predominantly invades coastal dune and headland vegetation communities, including rainforests and open forest. The plant smothers vegetation and has become an invader following the control of bitou bush at sites on the North Coast. Once established, it is difficult to control due to its perennial growth.

Black-eyed Susan, a garden escape, has the ability to smother native vegetation and reproduces from stem fragments.

Management Objectives

Focus control programs on infestations identified in BPWW and also in the upper catchments as a priority. Target and treat isolated infestations of exotic vines and scramblers which are known to be problematic in similar environments.

Control Priorities

- Treat all exotic vines and scramblers in identified BPWW sites.
- Investigate the possible infestation of glory lily in Khappinghat National Park.
- Maintain treatment of morning glory and white passionfruit infestations on offshore islands in the vicinity of Goulds Petrel habitat.

Control Techniques

A variety of techniques can be utilised to treat exotic vines depending on the extent and location of infestations and the type of vegetation community in which the vines are growing. Small infestations and seedlings can be removed physically ensuring removal of all below and above ground tubers for some species, particularly madeira vine. Herbicide treatment and application concentration varies for each species. NPWS has an off-label permit for the treatment of these weeds and others with herbicide.

Monitoring

All treatment will be recorded and information maintained.

Monitor to prevent further establishment of glory lily in Hunter Region reserves by communicating with Local Government Weeds Control Officers and through visual inspections of high risk sites.

Lantana camara (Lantana) for Hunter Region

Distribution and Abundance

Lantana is a common widespread weed growing east of the Barrington Tops. It occurs in a variety of vegetation communities such as sand dunes, heath and open forest, and it proliferates in wet forest and rainforest. There is an isolated infestation in Towarri National Park.

Impacts

Lantana is a WONS and a Control Class 4 noxious weed in all LGAs of the Hunter Region. Lantana has been listed as a KTP under the *TSC Act.*

Lantana infests a wide variety of natural ecosystems. Its dense thickets exclude native species through smothering and allelopathic effects, dominating understoreys and reducing biodiversity (DNRME 2004). In Hunter Region, lantana infestations impact on Endangered Ecological Communities such Littoral Rainforest, Swamp Oak Floodplain Forest and Swamp Sclerophyll Forest and a number of threatened species.

Management Objectives

In 2010 the WONS program prepared the Plan to Protect Environmental Assts from Lantana (*Lantana camara*) (Biosecurity Queensland 2010). The sites of high priority significance identified in this plan have been incorporated in the BPWW.

Control Priorities

- Control lantana at sites identified in BPWW.
- Continue control programs in Black Bulga and Copeland Tops state conservation areas, Berrico and Snapper Island nature reserves, and Columbey, Towarri, Wallaroo and Wallingat national parks.

Control Techniques

Physical removal of seedlings and cut-and-paint technique for isolated infestations in sensitive environments. Herbicide treatment using the splatter gun, backpack spraying, vehicle-mounted spray units for heavy infestations.

A number of lantana biocontrol agents have been released across the Hunter Region, however none of these agents have successfully established.

Monitoring

Records of lantana control programs are maintained.

Monitoring of biocontrol releases is undertaken at Coorabakh, Khappinghat and Talawahl National Parks.

An annual monitoring program (5 x 10sq metre quadrats) has been established on Snapper Island Nature Reserve to identify the effectiveness of lantana control and success of native species regeneration in littoral rainforest.

A permanent monitoring site has been established in Columbey National Park with the Pest Management Unit (Head Office) to further understand lantana invasion and native plant rehabilitation following control.

Opuntia stricta (Prickly Pear), *O. aurantiaca* (Tiger Pear) for Hunter Region

Distribution and Abundance

Prickly pear infestations are scattered throughout the region and in some cases controlled effectively by the presence of the Cactoblastis (*Cactoblastis cactorum*) and Cochineal (*Dactylopius opuntiae*) insects. In exposed coastal landscapes these two biological controls have difficulty establishing and therefore prickly pear has become a major weed on Broughton and Boondelbah Islands. Tiger pear occurs in Scone Mountain National Park, and Burning Mountain and Camerons Gorge nature reserves, where biocontrol activity alone is not controlling these infestations.

Impacts

Dense patches of pears form an impenetrable barrier and provide harbour for introduced species. On Boondelbah Island a dense infestation threatens suitable breeding habitat for the endangered Goulds Petrel (*Pterodroma leucoptera*).

The large sharp spines and barbed bristles readily penetrate human skin causing severe irritation and are difficult to remove (Parsons and Cuthbertson 1992).

Management Objectives

Treat pears in recreation areas to minimise impact on human health.

Continue to strategically release biocontrol agents.

Control Priorities

- Undertake control programs on infestations identified in BPWW.
- Continue control of prickly pear infestations on Boondelbah Island to protect breeding habitat for endangered population of Goulds Petrel.
- Continue prickly pear control on Broughton Island to minimize human injury and reduce spread throughout the native vegetation.
- Continue tiger pear control adjoining recreation areas in Burning Mountain and Camerons Gorge nature reserves.

Control Techniques

Biological control agents including the Cactoblastis and Cochineal insect are the preferred methods of control for scattered populations. Herbicide application will be used at priority locations.

Monitoring

All treatment will be recorded and information maintained.

Pinus species (Pine species) for Hunter Region

Distribution and Abundance

Major pine infestations occur as dense stands and individual wildlings that have spread from plantations and other plantings in or adjacent to reserves. Plantations occur on park as they were trial plots in previous state forest. Some of the plantings are now considered to have historic significance, eg The Glen Nature Reserve. Pine wildings are problematic in many reserves due to the location of plantations in adjoining lands.

Impacts

Pine species invade native plant communities, displacing native species. Plantations provide seed source for dispersal by wind and birds to neighbouring areas. Pine infestations are readily established, even in undisturbed environments, due to prolific rates of growth and seed production. Dense stands radically alter the structural and floristic characteristics of vegetation, creating dense shade, altering soil chemistry, depleting nutrients and displacing native species.

Priority Control

- Control wildlings in Back River, Darawank, Karuah, Minimbah, Talawahl and The Glen nature reserves, Booti Booti, Myall Lakes and Worimi national parks, and Buladelah, Medowie, Talawahl and Tilligerry state conservation areas.
- Prepare site specific control plans for plantations designated for removal, including those in Barrington Tops State Conservation Area, and Biriwal-Bulga, Crowdy Bay, Myall Lakes, Tapin Tops and Talawahl national parks. Planning should include restoration and rehabilitation involving potential harvesting and weed control.

Control Techniques

Pines are usually controlled by felling or by tree injection. Younger trees and seedlings can be treated by spraying with herbicide.

Monitoring

All treatment and any new incursions will be recorded and stored.

New incursions will be recorded and controlled where feasible.

Rubus fruticosus agg. (Blackberry) for Hunter Region

Distribution and Abundance

Blackberry occurs throughout the region. In coastal reserves such as Tomaree National Park Nature Reserve and Myall Lakes National Park isolated plants occur but are less invasive than other coastal weeds. Widespread infestations occur in inland reserves, particularly Barrington Tops, Crawney Pass, Curracabundi, Towarri and Woko national parks and Camels Hump and Khatambuhl Nature Reserve and Curracabundi and Coneac state conservation areas.

Impacts

Blackberry is listed as a WONS and a Class 4 noxious weed in all LGAs in the Hunter Region.

Blackberry can thrive in a range of habitat and invades the banks of watercourses, roadsides, open forest and sub-alpine areas. Blackberries can impede access, provide habitat suitable for introduced species and treated plants provide increased fine fuels, increasing fire intensity. Blackberries spread from the stems which can root into the ground and through the dispersal of seed from fruit which is spread by animals (Parsons and Cuthbertson 1992).

Management Objectives

Blackberry infestations identified in BPWW or directly impact on neighbours and are part of a collaborative program will be a priority.

Control Priorities

- Treat blackberry at sites identified in BPWW.
- Blackberries in Towarri and Barrington Tops national parks directly impact on threatened species and endangered ecological communities. Blackberry control in these reserves is a priority.

Control programs in other reserves are not a critical priority and should only be undertaken as part of a long-term cooperative projects with surrounding neighbours or as part of other critical priority weed control programs.

Control Techniques

Integrated control techniques are utilised and include treatment of blackberry using herbicide applied from backpack sprayers, gas guns (splatter gun technique) and vehicle-mounted spray units. NPWS has an off-label permit for the aerial spot-spray application of herbicide for blackberry control in inaccessible areas. Fire can also be used as a primary tool for initial blackberry control.

The blackberry leaf rust fungus (*Phragmidium violaceum*) biocontrol has established in the Barrington Tops National Park which reduces fruit and seed on the plant (CRC 2003).

Monitoring

Mapping of treatment areas is undertaken throughout the Region and information maintained.

Establishment of the blackberry rust fungus is monitored as a part of a long-term vegetation community monitoring project undertaken in the Barrington Tops National Park plateau.

Woody Weeds for Hunter Region

- *Ailanthus altissima* (Tree of Heaven),
- *Lycium* species (Boxthorn),
- *Ligustrum lucidium* (Large-leaved Privet),
- *Ligustrum sinense* (Small-leaved Privet),
- *Rosa rubiginosa* (Sweet Briar)

Distribution and Abundance

Tree of heaven, boxthorn and sweet briar are most common in reserves of the Upper Hunter. Extensive infestations of boxthorn are present in Brushy Hill Nature Reserve and sweet briar is present in Curracabundi and Wallabadah national parks and Camerons Gorge and Watchimbark nature reserves. Privet species occur mostly along creeklines of inland reserves in a range of vegetation communities.

Impacts

Many of these weeds have largely established along creeklines following the removal of native vegetation for agriculture. In Towarri and Curracabundi national parks many of these weeds were planted. These weeds now prevent the reestablishment of native species and adversely impact on existing native vegetation remnants. Control programs must consider the impact of removal on stream bank stability.

Management Objectives

Establish programs with neighbours and CMAs to implement priority programs and others identified in BPWW.

Control Priorities

- Treat all woody weeds at sites identified in BPWW.
- Monitor areas where control previously undertaken in Barrington Tops, Scone Mountain and Towarri national parks, and Wingen Maid Nature Reserve; control as required
- Treatment of isolated privet in Towarri National Park.
- Treatment of isolated tree of heaven and sweet briar in Curracabundi National Park.

Control Techniques

All species can be controlled using cut-and-paint technique or foliage spraying. Tree of heaven can also be treated using basal bark and stem injection techniques.

Monitoring

Control program results will be recorded and maintained.

Eucalypt dieback associated with over-abundant psyllids and bell miners (BMAD) for Hunter Region

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. Forests within the Hunter Region are at risk or have already been affected by BMAD. Areas of BMAD are known to occur in a number of reserves in the Hunter Region and are detailed in the Weed Distribution tables (Section 8.2). 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 (*Manorina melanophrys*) 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* and *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 and White Gum Moist 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 and yellow-bellied gliders and brush-tailed phascogale may all be at risk of decline due to poor forest health.

Management Objectives

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.

Control Priorities

Control of BMAD is a difficult challenge 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 OEH.

Monitoring

Monitoring of location and size of BMAD affected areas and 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.

Dingo Risk Management (*Canis lupus* dingo) for Hunter Region

Distribution and Abundance

Dingo issues associated with visitor areas are likely to occur within a number of reserves in Hunter Region. To date, the focus has been in Myall Lakes National Park. Pure bred dingoes and their hybrids occur throughout the park. The majority of dingo human interactions occur within the vicinity of the Mungo Brush camping areas and to a lesser extent the Seal Rocks area.

Myall Lakes National Park and a range of other reserves are listed as Schedule 2 lands on Pest Control Order No.17 with respect to wild dogs under the *Rural Lands Protection Act 1998*. Appendix 2 details all Schedule 2 lands within Hunter Region.

Impacts

Dingoes primarily frequent camping and picnic areas in search of food. The scavenging for food and direct feeding of dingoes by humans has resulted in their loss of fear and subsequent habituation. Habituated dingoes in camping areas can lead to negative interactions with humans through stealing food and belongings, and the threat to human safety. Dingoes may also spread disease such as hydatid tapeworms which are transferred to humans through scats or direct contact.

Management Objectives

Management of dingoes in visitor areas promotes visitor safety and the conservation of dingoes. A risk management approach has been adopted for dingo management, whereby the likelihood and consequence of dingo-human interactions are evaluated. Control strategies to lessen the risk are then implemented. It is acknowledged that not all dingo-human risks can be controlled and visitors must be informed of the risks.

The Risk Treatment Plan for Myall Lakes National Park, detailing risk assessments and control strategies for this issue, will be managed and implemented by Great Lakes Area with assistance from the Operations Support and Coordination Unit (Hunter Region).

Monitoring

Monitoring involves three levels - preventative, reactive and research.

Preventative monitoring consists of:

- Colour ear-tagging dingoes frequenting camping areas as appropriate;
- Recording negative dingo-human interactions;
- Sand plot monitoring of the relative abundance of dingoes;
- Implementation of a Risk Treatment Plan; and
- Dingo aware signage and pamphlets for visitors.

Reactive monitoring includes:

- Evaluating individual dingo risk.

Research includes:

- Social relationships within the pack, and DNA collection and analysis.

Plant Pathogen (*Phytophthora cinnamomi*) for Hunter Region

Distribution and Abundance

Phytophthora cinnamomi (Phytophthora) is a soil-borne pathogen belonging to the water mould group whose growth and reproduction is favoured by moist soil conditions and warm temperatures. The spores can be dispersed over relatively large distances by surface and subsurface water flows and can also be readily transported in contaminated soils. Humans have the potential to spread *Phytophthora cinnamomi* further and faster than any other vector through the movement of infected soil, water or plant material. Once inside a host plant, Phytophthora spores colonise the vascular tissue and restrict the uptake of water and nutrients, killing the host plant.

The pathogen is well-known in Western Australia, Victoria and Tasmania having caused significant impacts to native forests. It is also present in coastal Queensland and eastern NSW however disease expression in these areas is more cryptic and the extent of the threat is not known.

Phytophthora occurs in the sub-alpine Barrington Tops plateau. An area of the plateau has been quarantined to prevent the spread to uninfected catchments. It has also been identified in Myall Lakes National Park and there is a likelihood that it occurs within other reserves within Hunter Region.

Impacts

Infection of native plants by *Phytophthora cinnamomi* has been identified as a key threatening process for a number of threatened species (DECC 2007c). A national threat abatement plan for Phytophthora was prepared in 2001 and a statement of intent was prepared for NSW in 2008 (DECC 2008b).

Phytophthora cinnamomi is the most widespread and destructive of the 32 Phytophthora species that occur in Australia and is listed as key threatening process under both State and Federal legislation. Susceptible species display a range of symptoms; some are killed, some are damaged but endure, and some show no apparent symptoms. In some circumstances, *P. cinnamomi* may contribute to plant death where there are other stresses present (e.g. waterlogging, drought, and wildfire).

Management Objectives

Prevent further species or ecological communities from becoming threatened.

Test for the occurrence of Phytophthora within other reserves in the region, specifically those with threatened fauna and ecosystems at risk from impacts of this pathogen.

Prevent the introduction of Phytophthora into Watchimbark Nature Reserve to ensure the protection of the unique serpentine communities within the reserve.

Control Priorities

- Identify presence of Phytophthora by conducting surveys and sampling areas of poor tree health or dieback
- Implementation of a containment strategy for the Barrington Tops plateau to increases public awareness and understanding of the issue.
- Identify and implement appropriate containment and hygiene protocols for affected areas. Reduce public access to infected catchments. Provision of boot-washing stations for bush-walkers at appropriate points around quarantine area in Barrington Tops National Park.
- Use of installed wash down facilities for equipment within the infected areas.

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
- No widespread current control options are available for the Barrington Tops.

Monitoring

- Monitoring of vegetation in key locations to determine impacts on vegetation and key species
- Soil sampling in areas adjoining containment boundaries to monitor any movement.
- Opportunistic checking of dieback in known areas.
- Soil sampling and monitoring of ecosystems within Watchimbark National Park for signs of early infestation to enable early treatment.

Myrtle Rust (*Uredo rangelii*) for Hunter Region

Distribution and Abundance

Myrtle rust is a plant disease caused by the exotic fungus *Uredo rangelii*. It was first detected in Australia on 23 April 2010 on the NSW Central Coast. It has established in coastal NSW from the Clyde River north into Queensland (Figure 1). Myrtle rust is likely to spread rapidly to the extent of its biological range as the spores are dispersed readily by wind. Eradication is unfeasible.

Uredo rangelii belongs to a group of closely-related fungi known as the guava or eucalyptus rust complex. The complex includes the fungus *Puccinia psidii* which has had severe impacts on eucalypt plantations in Brazil and has been found in other parts of the Americas, Hawaii and Japan. *P. psidii* was considered as a potential biocontrol agent in the Florida everglades for the invasive plant *Melaleuca quinquenervia*, but it has since been found to attack some native American species, including a threatened species.

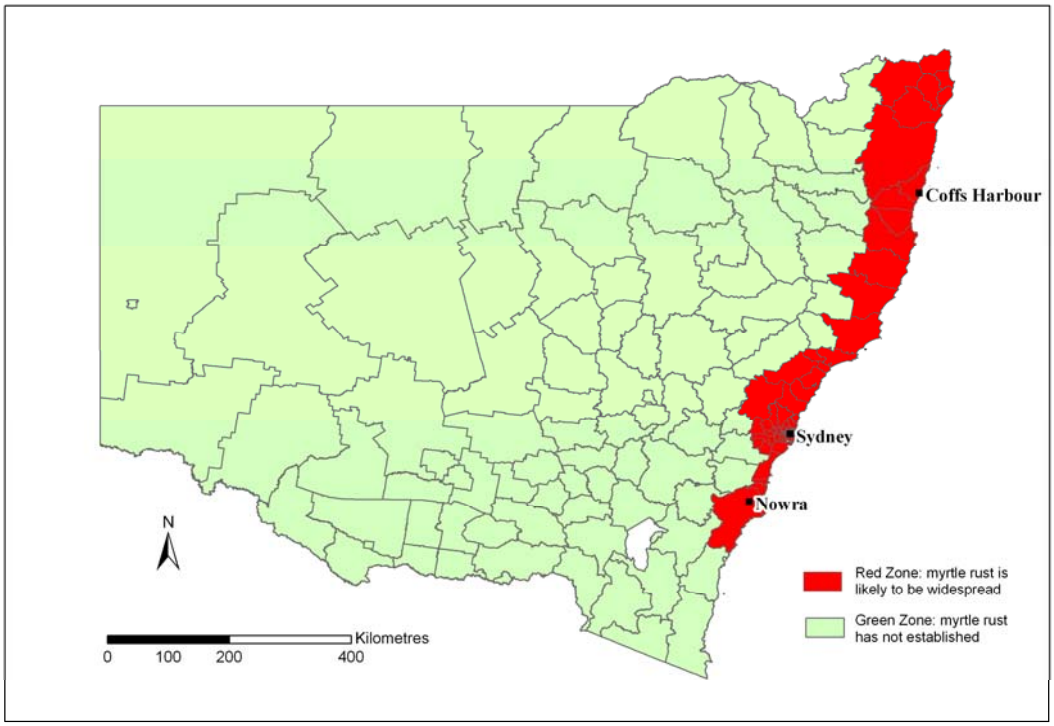


Figure 1: Approximate distribution of myrtle rust *Uredo rangelii* as of 24/01/2011. The red zone is comprised of local government areas where rust has been detected and is likely to be widespread. The green zone is comprised of local government areas where rust has not established. Data from NSW Department of Primary Industries (http://www.dpi.nsw.gov.au/biosecurity/plant/myrtle-rust). Local government boundaries from the Land and Property Management Authority

Impacts

The 'Introduction and establishment of Exotic Rust Fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae' is listed as a KTP under the *TSC Act*.

Myrtle rust affects plants in the family Myrtaceae, including the genera Eucalyptus, Angophora, Callistemon, and Melaleuca. Infection occurs on young growing shoots, leaves, flower buds and fruits. It produces masses of powdery bright yellow or orange-yellow spores on the infected areas. Leaves may become buckled and twisted and die as a result of infection.

The likely impacts of myrtle rust on biodiversity in Australia are unknown. Like *P. psidii*, infection with myrtle rust may cause significant mortality among younger plants

and hence reduce recruitment into adult populations. This may contribute to the decline and extinction of species, which is of immediate concern for those species already at high risk, i.e. threatened species. Reduced recruitment may also have severe impacts on the structure and function of the many natural ecosystems that depend on Myrtaceae. As at 28 March 2011, myrtle rust had been detected in 68 species of Myrtaceae, spanning 27 genera. Severe infection had been observed in relatively few species (most notably scrub turpentine *Rhodamnia rubescens* and native guava *Rhodomyrtus psidioides*) but the number of species so affected may increase as new strains of rust evolve. All five threatened species of Myrtaceae exposed to myrtle rust under laboratory test conditions became infected.

Priorities for Control

The *Management Plan for Myrtle Rust on National Parks* outlines how myrtle rust will be managed on national park estate in NSW, including the potential impacts of myrtle rust on threatened species. The plan also provides guidance to managers of other bushland and threatened species sites.

The objectives of the Plan are to:

1. Slow the establishment of myrtle rust on national park estate, and
2. Minimise the impacts of myrtle rust on threatened species and ecological communities on national park estate.

Control

The *Management Plan for Myrtle Rust on National Parks* includes 8 action areas to manage Myrtle Rust on the NPWS estate.

1. Identify high value assets at risk.
2. Limit the spread of myrtle rust.
3. Monitor the spread of myrtle rust.
4. Manage infections.
5. Research the impacts of myrtle rust.
6. Training, extension and external communication.
7. Record the incidence of myrtle rust.
8. Liaise and report on the spread and impacts of myrtle rust.

In Hunter Region, control has been undertaken on infected plants at Seal Rocks (Myall Lakes National Park) and Saltwater National Park in 2011. These sites continue to be monitored for effectiveness of control.

Monitoring

Presence/absence data will be entered into the Biological Survey Subsystem of the Wildlife Atlas from monitoring threatened species and sentinel sites.

If any fungicide control works are required, daily record sheets will kept for all control programs in accordance with the *Pesticides Act 1999*. Before and after photos are also taken during the course of implementation of works. Where treatment is proposed, GPS locations are taken of work site locations including the extent of myrtle rust distribution and control implemented. Sites are re-visited periodically for follow-up treatment and maintenance.

Amphibian chytrid fungus (*Batrachochytrium dendrobatidis*) for Hunter Region

Distribution and Abundance

Chytridiomycosis an infectious disease caused by the amphibian chytrid fungus or *Batrachochytrium dendrobatidis*. Believed to have evolved in Africa, the earliest recorded case of amphibian chytrid fungus infection was in South Africa in 1938. 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. 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.

Impacts

The disease affects amphibians worldwide and has been identified as a major cause of the decline and extinction of species. 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 *EPBC 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 (DECCW 2009).

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 or when they can evolve an evolutionary response to the threat imposed by the emergence of chytridiomycosis.

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

- 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

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.

8.1 Vertebrate Pest Distribution

● 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

"Alerts" - species previously eradicated from reserve and / or occurring in the surrounding landscape

VERTEBRATE PEST DISTRIBUTION	Wild dog	Fox	Pig	Rabbit	Horse	Goat	Deer	Cat	Other
BARRINGTON TOPS AREA									
Barrington Tops National Park	●	●	●	○	●	⊙	⊙	○	
Barrington Tops State Conservation Area	●	●	●	○	●	⊙	⊙	○	
Berrico Nature Reserve	○	○	⊙					○	
Black Bulga State Conservation Area	○	○						○	
Bretti Nature Reserve	●	○	○	⊙				○	
Camels Hump Nature Reserve	○	○	⊙					○	
Columbey National Park	○	○					⊙	○	Cattle incursions
Columbey State Conservation Area	○	○						○	Cattle incursions
Coneac State Conservation Area	○	○						○	
Copeland Tops State Conservation Area	○	○	⊙	⊙				○	
Curracabundi National Park	●	○	○	○	⊙	⊙	⊙	○	Cattle
Curracabundi State Conservation Area	●	○	○					○	
Killarney Nature Reserve	○	○				⊙		○	
Mernot Nature Reserve	○	○	○			○		○	
Monkerai Nature Reserve	○	○		○				○	
Monkeycot Nature Reserve	○	○	○			○		○	
The Glen Nature Reserve	○	○	⊙					○	
Watchimbark Nature Reserve	●	○	○	○				○	Cattle incursions
Woko National Park	●	○	○	○				○	

VERTEBRATE PEST DISTRIBUTION	Wild dog	Fox	Pig	Rabbit	Horse	Goat	Deer	Cat	Other	Alerts
GREAT LAKES AREA										
Bandicoot Island Nature Reserve										
Booti Booti National Park	○	○					⊙	○		Cane toads
Bulahdelah State Conservation Area		⊙						○		
Bull Island Nature Reserve										
Coolongolook Nature Reserve	○							○	Cattle incursions	
Darawank Nature Reserve	○	○						○		Cane toads
Durands Island Nature Reserve										
Flat Island Nature Reserve										
Ghin-Doo-Ee National Park	○							○	Cattle incursions	
Mills Island Nature Reserve										
Minimbah Nature Reserve	○								Cattle incursions	Cane toads
Myall Lakes National Park	●	○	⊙	⊙	⊙			○	Cattle incursions, Hare	Cane toads
Regatta Island Nature Reserve										
Seal Rocks Nature Reserve										
Smiths Lake Nature Reserve										
Wallingat National Park	○	○					⊙	○	Cattle incursions	Cane toads
Wallis Island Nature Reserve	○	○					○	○		
Yahoo Island Nature Reserve										

VERTEBRATE PEST DISTRIBUTION	Wild dog	Fox	Pig	Rabbit	Horse	Goat	Deer	Cat	Other	Alerts
HUNTER COAST AREA										
Boondelbah Nature Reserve										Black Rat
Broughton Island (MLNP)										Chytrid, Black Rat
Bushy Island Nature Reserve										
Corrie Island Nature Reserve	⊙	⊙								
Gir-um-bit Nature Reserve	○	○						○		Goat
Gir-um-bit State Conservation Area	○	○		○				○		
John Gould Nature Reserve (Cabbage Tree Is)									Corvids	Black Rat
Karuah Nature Reserve	○	○						○		
Karuah State Conservation Area	○	○					⊙	○	Cattle incursions	
Karuah National Park	○	○					⊙	○	Cattle incursions	
Little Broughton Island Nature Reserve										Black Rat
Medowie State Conservation Area	○	○		○				○		
Moffats Swamp Nature Reserve	○	○		○				○		
One Tree Island Nature Reserve										
Seaham Swamp Nature Reserve		○						○		Carp
Shark Island Nature Reserve										
Snapper Island Nature Reserve										
Stormpetrel Nature Reserve										Black Rat
Tilligerry National Park		○						○		
Tilligerry Nature Reserve		○						○		
Tilligerry State Conservation Area	○	○		○				○		Pig
Tomaree National Park		○		⊙				○		
Wallaroo National Park	○	○					⊙	○		
Worimi National Park	○	○		○			⊙	○	Cattle incursions	
Worimi Regional Park	○	○		○				○	Corvids	
Worimi State Conservation Area	○	○		○				○	Corvids	

VERTEBRATE PEST DISTRIBUTION	Wild Dog	Fox	Pig	Rabbit	Horses	Goat	Deer	Cat	Other	Alerts
MANNING AREA										
Barakee National Park	●	⊙	⊙	⊙	○			○		
Barakee State Conservation Area	●	⊙	⊙	⊙	○			○		
Biriwal Bulga National Park	●	⊙		⊙			⊙	○	Cattle incursions	
Brimbin Nature Reserve	○	○	⊙					○		
Bugan Nature Reserve	●	⊙	⊙				⊙	○	Cattle incursions	
Coocumbac Island Nature Reserve		●								
Coorabakh National Park	○	⊙						○		
Coxcomb Nature Reserve	○	⊙						○		
Crowdy Bay National Park	●	●		⊙		⊙		●		Cane toad
Goonook Nature Reserve	●	○	⊙	⊙				○		
Khappinghat Nature Reserve	●	●	⊙	⊙		⊙	⊙	●	Cattle incursions	
Khatambuhl Nature Reserve	●	⊙	⊙	⊙				○		
Killabakh Nature Reserve	○	⊙	⊙					○		
Lansdowne Nature Reserve		⊙						○		
Saltwater National Park	⊙	●		●		⊙		●		
Talawahl Nature Reserve	●	○						○	Cattle incursions	
Talawahl State Conservation Area	●	○						○		
Tapin Tops National Park	○	⊙	⊙	⊙				○		
Towibakh Nature Reserve	○	○						○		
Wallamba Nature Reserve	●	●		⊙				○		
Weelah Nature Reserve	○	⊙						○		
Wingham Brush Nature Reserve		●						●		

VERTEBRATE PEST DISTRIBUTION	Wild dog	Fox	Pig	Rabbit	Horse	Goat	Deer	Cat	Other	Alerts
UPPER HUNTER AREA										
Back River Nature Reserve	○	○	○					○		
Barrington Tops National Park	○	○	○	⊙	⊙	⊙	⊙	○		
Barrington Tops State Conservation Area	○	○	○	⊙	○		⊙	○		
Ben Halls Gap National Park	○	○	○	○		○	○	○		
Brushy Hill Nature Reserve	⊙	○		⊙		⊙	○	○	Cattle incursions	
Burning Mountain Nature Reserve		○		⊙				○	Cattle incursions	
Camerons Gorge Nature Reserve	○	○	○	⊙		○	○	○		
Camerons Gorge State Conservation Area	○	○	⊙	⊙		○		○		Deer
Cedar Brush Nature Reserve	○	○	⊙	⊙			●	○	(Fallow deer)	
Crawney Pass National Park	○	○	⊙	⊙		○	○	○		
Curracabundi National Park (Kalungra section)	○	○	○		⊙			○		Deer, goat
Murrurundi Pass National Park	○	○	⊙	○		●	●	○	(Red and Fallow deer)	
Scone Mountain National Park		○	⊙	○				○	Cattle/horse incursions	
Tomalla Nature Reserve	○	○	⊙	⊙	⊙			○		Deer
Towarri National Park	○	○	○	⊙		○	○	○	Cattle incursions	
Wallabadah Nature Reserve	○	○	⊙			○	○	○		Pig, goat
Wallabadah National Park		○		⊙				○	Horse incursions	
Wingen Maid Nature Reserve	⊙	○	○	⊙			○	○	Cattle incursions	
Woolooma National Park	○	○	⊙			⊙	⊙	○		

8.2 Weed Distribution

● Denotes established widespread infestation throughout a reserve

○ Denotes scattered infestation throughout a reserve

⊙ Denotes isolated infestation restricted to a small geographic area of a reserve (encompassing new weed incursions)

"Alerts" - species previously eradicated from reserve and / or occurring in the surrounding landscape presenting potential threat of infestation

WEED DISTRIBUTION	*Asparagus* spp.	Blackberry	Black-eyed Susan	Cape Ivy	Crofton Weed	GPG	Inkweed	Lantana	*Leucanthemum*	Madeira Vine	Mistflower	Moth Vine	*Opuntia* spp.	Pasture Grasses	Scotch Broom	Smooth Senna	St Johns Wort	Sweet Briar	Thistles	Tree of Heaven	*Xanthium* spp.	Yorkshire Fog	BMAD	Phytophthora	Other	Alerts
BARRINGTON TOPS AREA																										
Barrington Tops NP		●			⊙			●	⊙		⊙			○	●				○			○	⊙	⊙	Bamboo, Nodding Thistle	
Barrington Tops SCA		○												○	●											
Berrico NR		⊙			⊙	⊙		⊙			⊙			○									⊙			
Black Bulga SCA		⊙			○			●			○			○											Giant Rat's Tail Grass	
Bretti NR		⊙			○		○	●			○	⊙		○												
Camels Hump NR		○			○			●					○	○												
Columbey SCA		⊙						○						○												
Columbey NP								○																	*Aloe* spp., *Opuntia* spp.	Pampas Grass, Pine spp.
Coneac SCA		○			○		⊙	●			○	○		○									⊙		Red Lantana	
Copeland Tops SCA	⊙	⊙	⊙		●	⊙		●		⊙	⊙	○		○		○			○				⊙		Red Lantana, Potato Vine	Japanese Honeysuckle
Curracabundi NP*	⊙	○		○	⊙	⊙	○	○		○		○	○	○		⊙	⊙	○	○	⊙	○		⊙		*see below	
Curracabundi SCA		○						●		○			○	○							○					
Killarney NR		⊙			○			●			○			○												
Mernot NR													○	○												
Monkerai NR		○	⊙		○			●			○			○												
Monkeycot NR	⊙	○			○			○				○	○	○												
The Glen NR	⊙	⊙			●	○		●	⊙		●			○		⊙								⊙		*Pinus patula*, Bridal Creeper	Formosan Lily
Watchimbark NR		⊙			●		○	⊙		○	○	●	○	○			○	○	○		○			⊙			
Woko NP		○		●	○	⊙	○	●			○	○	○	○							○			⊙		

*Curracubundi NP Others *Cotoneaster* spp., *Macfadyena unguis-cati* (Cat's Claw Creeper), *Salix* spp. (Willow), *Schinus areira* (Pepper Tree)

WEED DISTRIBUTION	*Asparagus* spp.	Bamboo	Bitou Bush	Blackberry	Black-eyed Susan	Camphor Laurel	Cape Ivy	Coral Tree	Crofton Weed	Exotic Beach Herbs	Exotic Grasses	GPG	Lantana	Madeira Vine	Mistflower	Morning Glory	Moth Vine	Mother of Millions	Narrow-leaved Cotton Bush	Noogoora Burr	*Opuntia* spp.	Pampas Grass	Pine spp.	Privet spp.	Rattlepod	*Senna pendula*	Wandering Jew	Wild Watsonia	White Passionfruit	BMAD	Myrtle Rust	Phytophthora	Other	Alerts
GREAT LAKES AREA																																		
Bandicoot Island NR	Unknown												⊙																					
Booti Booti NP*	○	⊙	●	⊙	⊙		⊙	⊙	○	⊙	●		●	⊙		○	⊙	⊙	○		⊙	⊙			⊙	⊙		⊙	○					* see below
Bulahdelah SCA											⊙		○										⊙	⊙										
Bull Island NR	Unknown																																	
Coolongolook NR													○																					
Darawank NR	⊙		○										○										⊙											Glory lily
Durands Island NR	Unknown																																	
Flat Island NR	Unknown																																	
Ghin-Doo-Ee NP									●		⊙		●						⊙											⊙				
Mills Island NR	Unknown																																	
Minimbah NR								⊙	○		⊙		⊙			⊙			○			⊙	⊙		○									
Myall Lakes NP	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	○	⊙	○	○	●	⊙	○	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	○	⊙	⊙	⊙		⊙	⊙	Yucca	Aquatic weeds
Regatta Island NR	⊙																																	
Seal Rocks NR																																		
Smiths Lake NR	Unknown																																	
Wallingat NP				⊙					○		⊙		●		⊙				⊙					⊙										Pine spp.
Wallis Island NR			○						○		⊙		○			⊙						⊙						⊙					
Yahoo Island NR	○		○										○	⊙		⊙										⊙		○					

Exotic Beach Herbs *Arctotheca* spp. (Beach Daisy), *Eryngium maritimum* (Sea Holly), *Cakile* spp.(Sea Rocket), *Hydrocotyle bonariensis* (Penny Wort)

Aquatic Weeds *Salvinia molesta* (Salvinia), *Eichhornia crassipes* (Water hyacinth), *Cabomba caroliniana* (Cabomba), *Myriophyllum aquaticum* (Parrot's Feather), *Sagittaria* spp. (Arrowheads)

*Booti Booti NP Alerts *Cinnamomum camphora* (Camphor Laurel), *Gloriosa superba* (Glory Lily), *Lilium formosanum* (Formosan Lily), *Ligustrum sinense* (Small Leaved Privet), *Sporobolus* sp.

WEED DISTRIBUTION	Bitou Bush	Blackberry	Bridal Creeper	Bamboo	Camphor Laurel	Climbing *Asparagus*	Crofton Weed/Mistflower	Coral Tree	Exotic Beach Herbs	Dolicos Pea	Exotic Grasses	Formosa Lily	Garden Escapes	Ground Asparagus	*Juncus acutus*	Lantana	Morning Glory	Moth Vine	Mother of Millions	*Opuntia* spp.	Pampas Grass	Pine spp.	*Senna pendula*	Spiny Burr Grass	Turkey Rhubarb	White Passionfruit	Wandering Jew	Water Hyacinth	*Xanthium* spp.	BMAD	Other	Alerts
HUNTER COAST AREA																																
Boondelbah NR	○															○			●													
Bushy Island NR			⊙										⊙		⊙				⊙													
Broughton Island (MLNP	⊙						○	⊙		⊙	⊙					●			●													
Corrie Island NR	○																				⊙											
Gir-um-bit NP	⊙														⊙																	
Gir-um-bit SCA	⊙																															
John Gould NR	⊙															○			●						⊙							
Karuah NR		⊙						⊙							⊙						○											
Karuah SCA		⊙						⊙							⊙																	
Karuah NP		⊙						⊙							⊙			⊙			⊙											
Little Broughton Is NR	⊙										⊙					●			○													
Medowie SCA		⊙													⊙						⊙											
Moffats Swamp NR												⊙			⊙																	
One Tree Is NR			⊙										⊙		○				⊙												*Polygala* sp.	
Seaham Swamp NR		⊙			⊙						⊙				⊙	⊙		⊙											⊙		Paddy melon	
Shark Island NR	Unknown																															
Snapper Island NR			⊙			⊙	⊙					⊙			●		⊙		⊙						○							
Stormpetrel NR	○															○			○													
Tilligerry NR	⊙				⊙		⊙								○																	
Tilligerry NP														⊙																		
Tilligerry SCA	○			⊙								⊙			○					⊙	○				⊙		⊙				
Tomaree NP*	○	⊙	⊙		⊙		⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙		⊙	⊙		⊙	⊙	⊙		⊙	⊙	⊙		⊙				*see below	
Wallaroo NP		⊙						⊙							⊙															⊙		
Worimi NP	○							⊙		⊙	⊙		⊙							⊙	⊙											Phytophthora
Worimi SCA	○								⊙		⊙				⊙	⊙				⊙												
Worimi RP	○			⊙				⊙	⊙		⊙		⊙	⊙		⊙		⊙		○												

Exotic Beach Herbs *Cakile edentula (Sea Rocket), Crithmum maritimum* , *Eryngium maritimum* (Sea Holly), *Hydrocotyle bonariensis* (Penny Wort)

Exotic Grasses *Andropogon virginicus* (Whisky Grass), *Pennisetum clandestinum* (Kikuyu), *Sporobolus fertilis* (GPG), *Stenotaphrum secundatum* (Buffalo Grass)

*Tomaree NP Others *Ailanthus altissima* (Tree-o *Ailanthus altissima* (Tree-of-heaven), Asystasia gangetica (Chinese Violet), *Cyperus papyrus* (Papyrus), *Polygala* spp., *Strelitzia* spp. (Bird of Paradise)

WEED DISTRIBUTION	Aquatic Weeds	Bitou Bush	Blackberry	Camphour Laurel	Coastal Weeds	Coral Tree	Crofton Weed / Mistflower	Exotic Grasses	GPG	Ground Asparagus	Groundsel Bush	*Juncus acutus*	Lantana	Madeira Vine	Morning Glory	Moth Vine	Mother of Millions	*Opuntia* spp.	Pine spp.	Privet sp.	Wandering Jew	BMAD	Myrtle Rust	Other	Alerts
MANNING AREA																									
Barakee NP			⊙				⊙	⊙	○				⊙												
Barakee SCA			⊙				⊙	⊙	○				⊙												
Biriwal Bulga NP			⊙				⊙	⊙	⊙				⊙						⊙			⊙			
Brimbin NR							⊙	⊙	⊙				⊙												
Bugan NR							⊙	⊙	⊙				⊙												
Coocumbac Island NR					○			⊙					○	●	○	⊙		⊙			○				
Coorabakh NP					⊙		⊙		⊙				○												
Coxcomb NR							⊙						⊙												
Crowdy Bay NP	⊙	○		⊙	⊙	⊙	⊙	⊙	⊙	⊙	○		⊙		⊙			⊙	⊙						
Goonook NR							⊙	⊙	⊙				●												
Khappinghat NR		○		⊙	○	⊙	○	○	⊙	⊙		⊙	●		⊙		⊙	⊙		⊙				Non-indig. eucalypts	Glory Lily
Khatambuhl NR			○				○	⊙					●					⊙							
Killabakh NR							○	⊙	⊙				●		⊙					⊙	⊙	⊙			
Lansdowne NR					○		○	○		⊙			●	○	⊙			⊙			○				
Saltwater NP		○	⊙		○			⊙		●			○	⊙	⊙		⊙	⊙			⊙		⊙		
Talawahl NR					⊙		⊙	○	○				●						⊙						
Talawahl SCA					⊙		⊙	○	○				●						⊙						
Tapin Tops NP			⊙				⊙	⊙	○				○						⊙	⊙		⊙			
Towibakh NR		⊙		○	○		⊙	⊙	○				○		⊙					⊙					
Wallamba NR							⊙	⊙	○				●												
Weelah NR							⊙		⊙				⊙												
Wingham Brush NR					⊙									⊙	⊙			⊙			⊙				

Coastal Weeds *Senna pendula* (Senna), *Lilium formosanum* (Formosan Lily), *Schefflera actinophylla* (Umbrella Tree), *Solanum mauritianum* (Tobacco Bush)
Aquatic Weeds *Eichhornia crassipes* (Water hyacinth), *Pistia stratiotes* (Water lettuce), *Salvinia molesta* (Salvinia)

WEED DISTRIBUTION	*Aloe* spp.	Blackberry	Blue Periwinkle	Blue Heliotrope	Box Thorn	Bridal Creeper	Castor Oil	*Galenia*	Lantana	*Leucanthemum*	*Opuntia* spp.	Pasture Grasses	Patersons Curse	Pine spp.	St Johns Wort	Scotch Broom	Sweet Briar	Thistle spp.	Thorn Apple	Tree of Heaven	Willow	*Xanthium* spp.	Yorkshire Fog	BMAD	Other	Alerts
UPPER HUNTER AREA																										
Back River NR														⊙												
Barrington Tops NP		○								○						●		○		⊙			○		Crofton Weed	
Barrington Tops SCA		⊙								○				⊙		●		○					○			St Johns Wort
Ben Halls Gap NP		⊙										⊙						⊙								
Burning Mountain NR				⊙							●	⊙			⊙			⊙				⊙				Coolatai Grass
Brushy Hill NR					●		⊙	⊙			●	○	⊙				⊙	○	⊙			⊙			Hemlock, Pepper Tree	
Camerons Gorge NR	⊙	⊙	⊙		⊙	⊙	⊙				●	⊙	⊙		⊙		○	○			⊙	⊙			Giant Reed, *Robinia*	
Camerons Gorge SCA					⊙						●	⊙														
Cedar Brush NR																		⊙				⊙				
Crawney Pass NP		○										○			⊙		⊙	○				⊙			Sweet Pittosporum	
Curracabundi NP (Kalungra)		⊙	⊙								○	○	⊙					⊙		⊙		⊙				
Murrurundi Pass NP		⊙		⊙	⊙						⊙	●	⊙		⊙		⊙	○		⊙		⊙			Coolatai Grass	Coolatai Grass
Scone Mountain NP				○	⊙	⊙		●			●	●	○		⊙		⊙	○				○		⊙		
Tomalla NR			⊙									⊙						○								
Towarri NP*		○	⊙		⊙	⊙	⊙	⊙	⊙		⊙	○	⊙		⊙		⊙	○	⊙	⊙		○			Privet spp.	*see below
Wallabadah NR		⊙									⊙	○						⊙								St Johns Wort
Wallabadah NP		⊙			⊙						⊙	●			○		○	○								
Wingen Maid NR											●	⊙								⊙						
Woolooma NP																								⊙		

*Towarri NP Alerts *Olea europaea* (Olive spp.), *Senna septemtrionalis* (Smooth Senna), *Ulex europaeus* (Gorse)

9. References

Agriculture and Resource Management Council of Australia and New Zealand, Australian and New Zealand Environment and Conservation Council and Forestry Ministers (ARMC) (2001). *Weeds of National Significance Bridal Creeper (*Asparagus asparagoides*) Strategic Plan*. National Weeds Strategy Executive Committee, Launceston.

Biosecurity Queensland on behalf of the National Lantana Management Group (2010). *Plan to Protect Environmental Assets from Lantana* (Lantana camara). Department of Employment, Economic Development and Innovation, Yeerongpilly, Queensland.

Buchanan RA (1994). *Bush Regeneration Recovering Australian Landscapes*, TAFE NSW.

CRC (2003). *Weed Management Guide - Blackberry (*Rubus fruticosus *species aggregate*). Co-operative Research Centre for Weed Management.

Department of Environment and Conservation (DEC) (2006a). *NSW Threat Abatement Plan – Invasion of Native Plant Communities by* Chrysanthemoides monilifera *(Bitou Bush and Boneseed).* Department of Environment and Conservation, NSW.

Department of Environment and Conservation (DEC) (2006b). *Operational Plan for the Removal of Feral Horses from the Nerong Area - Myall Lakes National Park*. Unpublished plan.

Department of Environment and Climate Change (DECC) (2007a). *NSW Scientific Committee –final determination. Exotic perennial grasses – Key Threatening Process listing*, DECC.

Department of Environment and Climate Change (DECC) (2007b). *NSW Scientific Committee –final determination. Exotic vines and scramblers – Key Threatening Process listing*, DECC.

Department of Environment and Climate Change (DECC) (2007c). *NSW Scientific Committee –final determination. Infection of native plants by* Phytophthora cinnamomi – *Key Threatening Process listing*, DECC.

Department of Environment and Climate Change (NSW) (2008) *Statement of Intent 1: Infection of native plants by* Phytophthora cinnamomi*.* NSW Department of Environment and Climate Change, Sydney.

Department of Environment, Climate Change and Water (NSW) (2009) *Statement of Intent 2: Infection of frogs by amphibian chytrid causing the disease chytridiomycosis.* NSW Department of Environment, Climate Change and Water, Sydney.

Department of Natural Resources, Mines and Energy (DNRME) (2004). *Lantana. Current Management and Control Options for Lantana (*Lantana camara*) in Australia*. Department of Natural Resources, Mines and Energy, QLD.

Drying J (1990) *The Impact of Feral Horses (*Equus caballus*) on Sub-alpine and Montane Environments*. Masters Thesis, University of Canberra, Canberra.

Environment Australia (2001) *Threat abatement plan for dieback caused by the root-rot fungus* Phytophthora cinnamomi*.* Commonwealth of Australia, Canberra.

Heinrich A and Dowling B (2000). Threats to the Rare and Threatened Plant Species of Barrington Tops. *Plant Protection Quarterly 15*.

Hone J (2002). Feral Pigs in Namadgi National Park, Australia: dynamics, impacts and management. *Biological Conservation 105*: 231-242.

Hosking JR, Smith JMB and Sheppard AW (1998). *Cytisus scoparius (L.)* ssp*. Scoparius.* In 'The Biology of Australian Weeds' Volume 2 Panetta FD, Groves RH and Shepherd RCH (eds) Richardson, Melbourne. 77-88.

Industry and Investment NSW (2009). Recognising Water Weeds. Plant Identification Guide. WeedED Resources.

Lamp C and Collet F (1999) *Field Guide to Weeds in Australia*, Inkata Press

NSW Department of Primary Industries (NSW DPI) (2006). *Salvinia Control Manual. Management and Control Options for Salvinia (Salvinia molesta) in Australia*, NSW Department of Primary Industries, Orange.

NSW DPI and OEH (2011). *Biodiversity Priorities for Widespread Weeds*. Report prepared for the 13 Catchment Management Authorities (CMAs) by NSW Department of Primary Industries and Office of Environment & Heritage, Orange.

National Parks and Wildlife Service (NPWS) (1999). *Salvinia Management Strategy 1999-2004 for Myall Lakes National Park*. Unpublished report.

National Parks and Wildlife Service (NPWS) (2001) *Scotch Broom Management Strategy – Works Program*, Barrington Tops National Park. Unpublished report.

Odom D, Griffith GR, Schroder M and Sinden JA (2003). Using aerial mapping to analyse factors affecting the spread of Scotch Broom. *Plant Protection Quarterly Vol.18 (1) 2003*

Parsons WT and Cuthbertson EG (1992). *Noxious Weeds of Australia*, Inkata Press.

10. Appendices

Appendix 1 – Declared Weeds

Common name (Scientific name)	Dungog	Gloucester	Great Lakes	Greater Taree	Liverpool Plains	Port Stephens	Tamworth	Upper Hunter
African boxthorn (*Lycium ferocissimum*)	4	4	4		4	4	4	4
African feather grass (*Pennisetum macrourum*)	5	5	5	5	5	5	5	5
African turnipweed (*Sisymbrium runcinatum*)	5	5	5	5	5	5	5	5
African turnipweed (*Sisymbrium thellungii)*	5	5	5	5	5	5	5	5
Aleman grass (*Echinochloa polystachya*)		2	2	2				
Alligator weed (*Alternanthera philoxeroides*)	2	2	2	2	2	3	2	2
Anchored water hyacinth (*Eichhornia azuerea*)	1	1	1	1	1	1	1	1
Annual ragweed (*Ambrosia artemisiifolia*)	5	5	5	5	5	5	5	5
Arrowhead (*Sagittaria montevidensis*)	4	4	4	4	4	4	4	4
Artichoke thistle (*Cynara cardunculus*)	5	5	5	5	5	5	5	5
Athel tree (*Tamarix aphylla*)	5	5	5	5	5	5	5	5
Bathurst burr (*Xanthium* spp.)	4	4	4	4	4	4	4	4
Bear-skin fescue (*Festuca gautieri*)	5	5	5	5	5	5	5	5
Black knapweed (*Centaurea nigra*)	1	1	1	1	1	1	1	1
Blackberry (*Rubus* spp.)	4	4	4	4	4	4	4	4
Bitou bush (*Chrysanthemoides monilifera* ssp. *rotundata*)			4	4		4		
Boneseed (*Chrysanthemoides monilifera* ssp. *monilifera*)	2	2	2	2	2	2	2	2
Bridal creeper *(Asparagus asparagoides)*	4	4	4	4	4	4	4	4
Broad-leaf pepper tree (*Schinus terebinthifolius*)		3	3	3				
Broomrapes (*Orobanche* sp.)	1	1	1	1	1	1	1	1
Burr ragweed (*Ambrosia confertiflora*)	5	5	5	5	5	5	5	5
Cabomba (*Cabomba caroliniana*)	5	5	5	5	5	5	5	5
Cape broom (*Genista monspessulana*)		2	2	2				
Cape tulip (*Homeria* spp.)	4					4		4
Cayenne snakeweed (*Stachytarpheta cayennensis*)	5	5	5	5	5	5	5	5
Chilean needle grass (*Nassella neesiana*)	4	4	4	4	4	4	4	4
Chinese celtis (*Celtis sinensis*)		3	3	3				
Chinese violet (*Asystasia gangetica* ssp. *micrantha*)	1	1	1	1	1	1	1	1
Clockweed (*Gaura parviflora*)	5	5	5	5	5	5	5	5
Columbus grass (*Sorghum* x *almum*)	4	4	4	4		4		4
Corn sowthistle (*Sonchus arvensis*)	5	5	5	5	5	5	5	5
Crofton weed (*Ageratina adenophora*)		4	4	4		4		
Dodder (*Cuscuta* spp.)	5	5	5	5	5	5	5	5
East Indian hygrophila (*Hygrophila polysperma*)	3	3	3	3	4	3	4	3
Espartillo (*Achnatherum brachychaetum*)	5	5	5	5	5	5	5	5
Eurasian water milfoil (*Myriophyllum spicatum*)	1	1	1	1	1	1	1	1
Fine-bristled burr grass (*Cenchrus brownii*)	5	5	5	5	5	5	5	5
Fountain grass (*Pennisetum setaceum*)	5	5	5	5	5	5	5	5
Galenia (*Galenia pubescens*)					4		4	
Gallon's curse (*Cenchrus biflorus*)	5	5	5	5	5	5	5	5
Giant Parramatta grass (*Sporobolus fertilis*)	3	3	4	4	3	3	3	3
Giant rat's tail grass (*Sporobolus pyramidalis*)		3	3	3				
Glaucous starthistle (*Carthamus glaucus*)	5	5	5	5	5	5	5	5
Golden dodder (*Cuscuta campestris*)	4	4	4	4	4	4	4	4
Golden thistle (*Scolymus hispanicus*)	5	5	5	5	5	5	5	5
Gorse (*Ulex europaeus*)	2					2		2
Green cestrum (*Cestrum parqui*)	3	3	3	3	3	3	3	3
Groundsel bush (*Baccharis halimifolia*)	3	3	3	3		3		
Harrisia cactus (*Harrisia* sp.)	4	4	4	4	4	4	4	4
Hawkweeds (*Hieracium* spp.)	1	1	1	1	1	1	1	1
Hemlock (*Conium maculatum*)								4
Heteranthera (*Heteranthera reniformis*)	1	1	1	1	1	1	1	1
Horsetail (*Equisetum* spp.)	1	1	1	1	1	1	1	1

Common name (Botanic name)	Dungog	Gloucester	Great Lakes	Greater Taree	Liverpool Plains	Port Stephens	Tamworth	Upper Hunter
Hydrocotyle (*Hydroctyle ranunculoides*)	1	1	1	1	1	1	1	1
Hygrophila (*Hygrophila costata*)	2	2	2	2		2		2
Hymenachne (*Hymenachne amplexicaulis* & hybrids)	1	1	1	1	1	1	1	1
Johnsons grass (*Sorghum halepense*)	4	4	4	4	4	4		4
Karoo thorn (*Acacia karroo*)	1	1	1	1	1	1	1	1
Kochia *(Bassia scoparia*)	1	1	1	1	1	1	1	1
Kosters Curse (*Clidemia hirta*)	1	1	1	1	1	1	1	1
Lagarosiphon (*Lagarosiphon major*)	1	1	1	1	1	1	1	1
Lantana (*Lantana* spp.)	4	4	4	4	4	4	4	4
Leafy elodea (*Egeria densa*)	4	4	4	4	4	4	4	4
Lippia (*Phyla canescens*)	4	4	4	4	4	4	4	4
Long-leaf willow primrose (*Ludwigia longifolia*)	4	4	4	4	4	4	4	4
Long-style feather grass (*Pennisetum villosum*)					4			
Mesquite (*Prosopis* spp.)					2		2	2
Mexican feather grass (*Nassella tenuissima*)	1	1	1	1	1	1	1	1
Mexican poppy (*Argemone mexicana*)	5	5	5	5	5	5	5	5
Miconia (*Miconia* spp.)	1	1	1	1	1	1	1	1
Mikania (*Mikania micrantha*)	1	1	1	1	1	1	1	1
Mimosa (*Mimosa pigra*)	1	1	1	1	1	1	1	1
Mistflower (*Ageratina riparia*)						4		
Mintweed (*Salvia reflexa*)			4					4
Mossman river grass (*Cenchrus echinatus*)	5	5	5	5	5	5	5	5
Mother-of-millions (*Bryophyllum delagoense*)	3	3	3	3	4	3	4	3
Nodding thistle (*Carduus nutans*)	4	4		4	4		4	4
Pampas grass (*Cortaderia* spp.)	4	4	4	4	4	4	4	4
Parkinsonia (*Parkinsonia aculeata*)					2		2	2
Parthenium weed (*Parthenium hysterophorus*)	1	1	1	1	1	1	1	1
Patersons curse (*Echium* spp.)	4	4	4	4	4	4		4
Perennial ragweed (*Ambrosia psilostachya*)					4		4	
Pond apple (*Annona glabra*)	1	1	1	1	1	1	1	1
Prickly acacia (*Acacia nilotica*)	1	1	1	1	1	1	1	1
Prickly pear (*Cylindropuntia* spp.)	1	4	4	4	4	4	4	4
Prickly pear (*Opuntia* spp.)	4	4	4	4	4	4	4	4
Red rice (*Oryza rufipogon*)	5	5	5	5	5	5	5	5
Rhus tree (*Toxicodendron succedaneum*)	4	4	4	4	4	4	4	4
Rubbervine (*Cryptostegia grandiflora*)	1	1	1	1	1	1	1	1
Sagittaria (*Sagittaria platyphylla*)	5	5	5	5	5	5	5	5
Salvinia (*Salvinia molesta*)	3	3	3	3	2	3	2	2
Scotch broom (*Cytisus scoparius*)	4	4			4		4	4
Scotch thistles *(Onopordum* spp.)					4		4	
Senegal tea plant (*Gymnocoronis spilanthoides*)	1	1	1	1	1	1	1	1
Serrated tussock (*Nassella trichotoma*)	4	4	4	4	3	4	3	3
Siam weed (*Chromolaena odorata*)	1	1	1	1	1	1	1	1
Silk forage sorghum (*Sorghum* sp. hybrid cultivar)					4			
Silver leaf nightshade (*Solanum elaeagnifolium*)					3		3	4
Smooth-stemmed turnip (*Brassica barrelieri* ssp. *oxyrrhina*)	5	5	5	5	5	5	5	5
Soldier thistle (*Picnomon acarna*)	5	5	5	5	5	5	5	5
Spiny burrgrass (*Cenchrus incertus*)	4	4	4	4	4	4		4
Spiny burrgrass (*Cenchrus longispinus*)	4	4	4	4	4	4		4
Spiny emex (*Emex australis*)	4					4		
Spotted knapweed (*Centaurea longispinus*)	1	1	1	1	1	1	1	1
St Johns wort (*Hypericum perforatum*)	3	3	3	3	3	4	4	4
Star thistle (*Centaurea calcitrapa*)					4			4
Sweet briar (*Rosa rubiginosa*)					4		4	4
Texas blueweed (*Helianthus ciliaris*)	5	5	5	5	5	5	5	5
Tree of heaven (*Ailanthus altissima*)								4
Tropical Soda Apple (*Solanum viarum*)	2	2	2	2	2	2	2	2
Water caltrop (*Trapa* spp.)	1	1	1	1	1	1	1	1

Common name (Botanic name)	Dungog	Gloucester	Great Lakes	Greater Taree	Liverpool Plains	Port Stephens	Tamworth	Upper Hunter
Water hyacinth (*Eichhornia crassipes*)	4	3	3	3	2	4	2	2
Water lettuce (*Pistia stratiotes*)	1	1	1	1	1	1	1	1
Water soldier (*Stratiotes aloides*)	1	1	1	1	1	1	1	1
Willows (*Salix* spp. except *S. babylonica*, *reichardtii*, *calodendron*)	5	5	5	5	5	5	5	5
Witchweed (*Striga* spp.)	1	1	1	1	1	1	1	1
Yellow burrhead (*Limnocharis flava*)	1	1	1	1	1	1	1	1
Yellow nutgrass (*Cyperus esculentus*)	5	5	5	5	5	5	5	5

Control Class 1 – State Prohibited Weeds - plants that pose a potentially serious threat to primary production or the environment and are not present in the State or are present only to a limited extent.

Control Class 2 – Regionally Prohibited weeds - plants that pose a potentially serious threat to primary production or the environment of a region to which the order applies and are not present in the region or are present only to a limited extent.

Control Class 3 – Regionally Controlled Weeds - plants that pose a serious threat to primary production or the environment of an area to which the order applies, are not widely distributed in the area and are likely to spread in the area or to another area.

Control Class 4 – Locally Controlled Weeds - plants that pose a threat to primary production, the environment or human health, are widely distributed in an area to which the order applies and are likely to spread in the area or to another area.

Control Class 5 – Restricted Plants - plants that are likely, by their sale or the sale of their seeds or movement within the State or an area of the State, to spread in the State or outside the State.

Control Classes 1, 2 and 5 noxious weeds are referred to as notifiable weeds.

Appendix 2 – Schedule 2 Lands