NSW GOVERNMENT
Office of Environment & Heritage
NSW National Parks & Wildlife Service

Regional Pest Management Strategy 2012–17: Lower North Coast Region

A new approach for reducing impacts on native species and park neighbours

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

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Cover photos, main: aerial spraying bitou bush in Myall Lakes National Park (F Miller/OEH); small: bush regenerators treating prickly pear on Broughton Island (R Armstrong/OEH); wild horses in Barrington Tops National Park (M Schroder/OEH); weed infestation at Wingham Brush Nature Reserve in the 1980s before bush regeneration (J Stockard); infrared image of a fox (A Fawcett/OEH).

Summary

Pests are among the greatest threats to biodiversity throughout Australia. In New South Wales 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 pest species have on biodiversity and also on neighbouring landholders are two of the main objectives in the NSW National Parks and Wildlife Service Lower North Coast Region.

Lower North Coast Region manages some 289,150 hectares of land in the Hunter, Hastings and Manning valleys. The Region extends from Stockton in the south, Port Macquarie in the north and inland to the Great Dividing Range. Lower North Coast 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.

Ongoing control of bitou bush includes aerial spraying of coastal reserves across the Region, particularly the coastline in Great Lakes Area. Since the beginning of 2011, approximately 50 kilometres of coastline between Stockton and Harrington have been treated.

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 in these reserves has been successful in protecting the biodiversity of these sites.

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

Pest issues in rural areas of the Manning catchment are associated with impacts from vertebrate pests. Extensive cooperative aerial and ground baiting programs continue to reduce wild dog populations.

During 2009, Broughton Island, which is 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 to evaluate the rehabilitation of the island’s vegetation.

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Abbreviations

BMAD	bell miner associated dieback
BPWW	Biodiversity Priorities for Widespread Weeds (BPWW CC1-6 refers to control categories within BPWW Statewide Framework[1])
EEC	endangered ecological community
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
FAWNA	for Australian wildlife needing aid
LGA	local government area
KTP	key threatening process
LHPA	Livestock Health and Pest Authority
NP	National park
NPWS	New South Wales National Parks and Wildlife Service
NR	Nature reserve
OEH	Office of Environment and Heritage
PWIS	Pest and Weed Information System
RP	Regional park
SCA	State conservation area
TAP	threat abatement plan
TSC Act	*Threatened Species Conservation Act 1995* (NSW)
WDMP	wild dog management plan
WoNS	Weed of National Significance

[1] http://www.dpi.nsw.gov.au/agriculture/pests-weeds/weeds/publications/cmas/cma_statewide-framework-web.pdf

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*.

NSW Invasive Species Plan provides specific goals, objectives and actions in relation to invasive species management.

This document is the Lower North Coast Region Pest Management Strategy and contains regionally specific components including prioritised pest programs.

The state strategy, Managing Pests in NSW National Parks, provides the broader planning framework for the management of pests by NPWS. It documents the policy and organisational context and describes the logic used for identifying, prioritising and monitoring pest management programs. It also establishes state-wide pest management goals, objectives and actions.

This regional strategy describes the local circumstances within the Region and applies the corporate framework from the state strategy to prioritise specific pest management programs. These priorities will be included in regional operations plans and implemented through the NPWS Asset Maintenance System. It also broadly identifies pest distribution and associated impacts across the Region.

2 Regional overview

Lower North Coast Region covers parts of the Hunter, Hastings and Manning valleys. It extends from Stockton in the south, to Port Macquarie in the north and inland to the Great Dividing Range.

Regional context

The Lower North Coast Region was one of the first areas in NSW cleared for agriculture, thus a wide range of plants and animals has been introduced. The landscape ranges from coast, sub-alpine areas and the western slopes, and the variation in land use includes rural, semi-rural, urban and natural areas; all of these landscapes involve a variety of pest management issues.

Park management

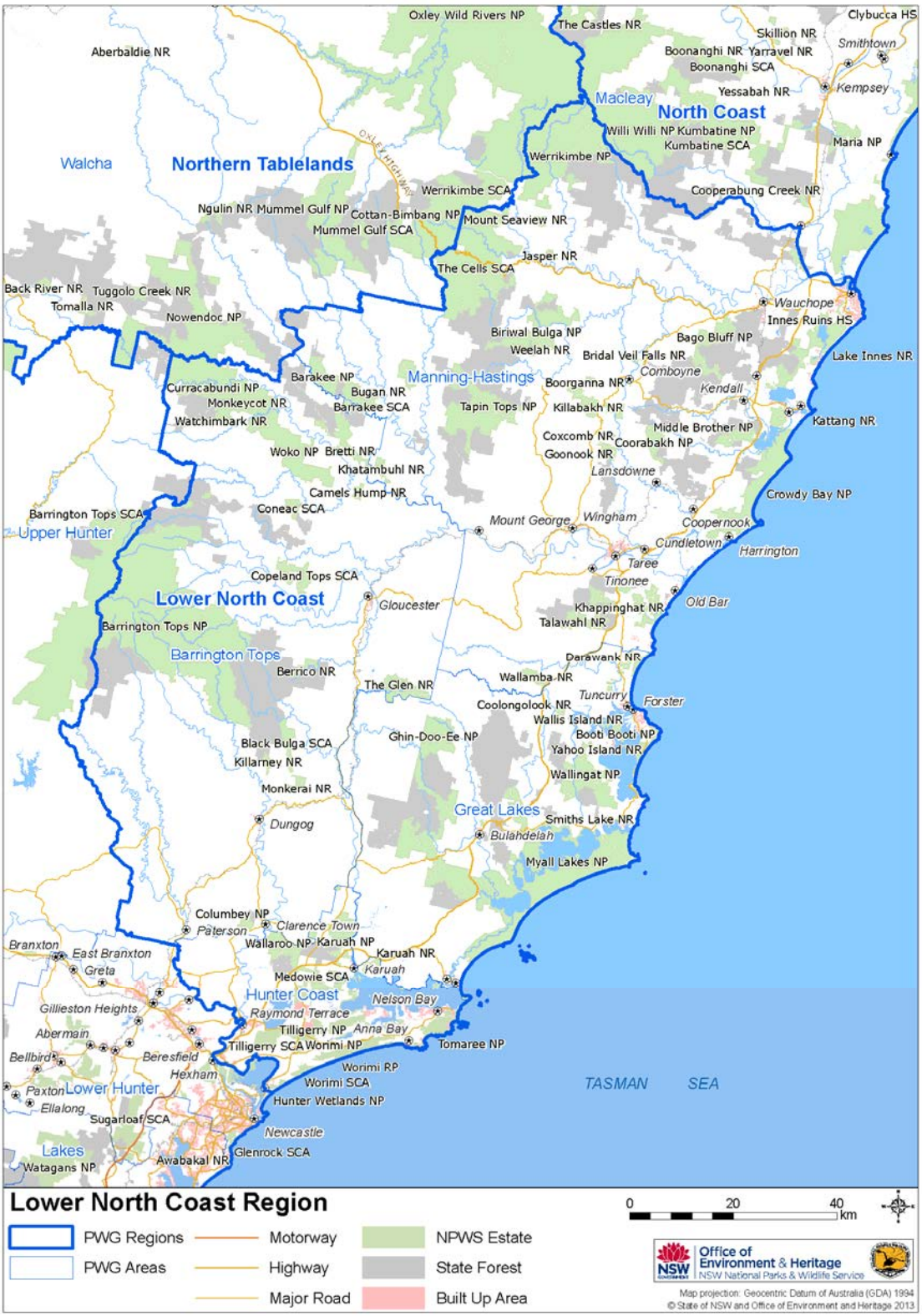
The Region is divided into four management areas: Barrington Tops, Hunter Coast, Great Lakes, Manning-Hastings. Lower North Coast Region manages 287,166 hectares of reserved land including 28 national parks, 17 state conservation areas, 62 nature reserves, two historic sites and one regional park.

Reserves in the Region protect a number of endangered ecological communities (EECs) including Freshwater Wetlands on Coastal Floodplains, Box Gum Woodland, 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 include the 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 *Acacia courtii*, *Acronychia littoralis*, *Allocasuarina defungens*, *A. simulans*, *Asperula asthenes*, *Callistemon linearifolius*, *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*, *Sophora tomentosa, Syzygium paniculatum*, *Tetratheca juncea* and *Thesium australe*.

Feral animal threats are the 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, since around 2007 there has been an observable increase in the number of feral deer in a range of locations. 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. Lower North Coast Region staff investigate all cane toad reports to ensure that populations do not become established.


Oxley Wild Rivers NP
The Castles NR
Clybucca HS
Skillion NR
Smithtown
Aberbaldie NR
Boonanghi NR
Yarravel NR
Boonanghi SCA
Yessabah NR
Kempsey
Macleay
North Coast
Willi Willi NP
Kumbatine NP
Kumbatine SCA
Maria NP
Walcha
Northern Tablelands
Werrikimbe NP
Werrikimbe SCA
Cooperabung Creek NR
Ngulin NR
Mummel Gulf NP
Cottan-Bimbang NP
Mount Seaview NR
Mummel Gulf SCA
Jasper NR
The Cells SCA
Back River NR
Tuggolo Creek NR
Tomalla NR
Nowendoc NP
Wauchope
Innes Ruins HS
Biriwal Bulga NP
Bago Bluff NP
Weelah NR
Bridal Veil Falls NR
Lake Innes NR
Comboyne
Manning-Hastings
Boorganna NR
Kendall
Barakee NP
Curracabundi NP
Bugan NR
Monkeycot NR
Barrakee SCA
Tapin Tops NP
Killabakh NR
Kattang NR
Watchimbark NR
Middle Brother NP
Coxcomb NR
Coorabakh NP
Woko NP
Bretti NR
Goonook NR
Khatambuhl NR
Lansdowne
Camels Hump NR
Crowdy Bay NP
Barrington Tops SCA
Coneac SCA
Mount George
Wingham
Coopernook
Upper Hunter
Cundletown
Harrington
Taree
Copeland Tops SCA
Tinonee
Lower North Coast
Gloucester
Khappinghat NR
Old Bar
Talawahl NR
Barrington Tops NP
Barrington Tops
Darawank NR
Berrico NR
Wallamba NR
The Glen NR
Tuncurry
Forster
Coolongolook NR
Wallis Island NR
Booti Booti NP
Ghin-Doo-Ee NP
Black Bulga SCA
Yahoo Island NR
Killarney NR
Wallingat NP
Monkerai NR
Great Lakes
Smiths Lake NR
Dungog
Bulahdelah
Myall Lakes NP
Columbey NP
Paterson
Clarence Town
Wallaroo NP
Karuah NP
Karuah NR
Branxton
East Branxton
Greta
Medowie SCA
Karuah
Hunter Coast
Nelson Bay
Gillieston Heights
Raymond Terrace
Tilligerry NP
Anna Bay
Abermain
Tilligerry SCA
Worimi NP
Tomaree NP
Bellbird
Beresfield
Worimi RP
Hexham
TASMAN
SEA
Worimi SCA
Paxton
Lower Hunter
Hunter Wetlands NP
Ellalong
Sugarloaf SCA
Newcastle
Lakes
Glenrock SCA
Awabakal NR
Watagans NP
Lower North Coast Region
PWG Regions
PWG Areas
Motorway
Highway
Major Road
NPWS Estate
State Forest
Built Up Area
0
20
40
km
Office of Environment & Heritage
NSW National Parks & Wildlife Service
Map projection: Geocentric Datum of Australia (GDA) 1994
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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 National Park, the brush-tailed rock-wallaby in Woko and Curracabundi national parks and endangered shorebirds in the Manning River 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 Port Stephens Local Government Area (LGA) to reduce predation on koala populations.

The dominant introduced plant species impacting on the natural environment include *Ageratina riparia* (mistflower), *Asparagus* species (bridal creeper, ground and climbing asparagus), *Chrysanthemoides monilifera* subspecies *rotundata* (bitou bush)*, Cytisus scoparius* (Scotch broom), *Lantana camara* (lantana), *Rubus anglocandicans* (blackberry), *Opuntia stricta* (prickly pear) and exotic vines and scramblers, including *Anredera cordifolia* (Madeira vine)*, Araujia sericifera* (moth vine), *Ipomoea* species (morning glory species) and *Macfadyena unguis-cati* (cat's claw creeper).

There are a number of potentially significant weed threats in Lower North Coast Region. Of greatest concern are aquatic weed infestations, particularly *Salvinia molesta* (salvinia), *Sagittaria platyphylla* (sagittaria) and *Cabomba caroliniana* (cabomba) in the catchment of the Myall Lakes. These species threaten the significant biodiversity values of the Ramsar wetlands of Myall Lakes National Park. Terrestrial weeds in coastal reserves include *Gloriosa superba* (glory lily) and *Lilium formosanum* (Formosan lily).

Community engagement

This pest management strategy has been developed through consultation with the community and NPWS staff.

Lower North Coast Region is actively involved with the LHPA, wild dog associations, local council weeds officers, Hunter–Central Rivers and Northern Rivers catchment management authorities and Forests NSW while undertaking pest management programs across the landscape. NPWS regularly liaises with its advisory committee, volunteer groups and neighbours.

In mid 2012, the NSW Government announced a new initiative to involve volunteer shooters in pest animal management on National Parks and Reserves. This initiative has been developed by NPWS into the Supplementary Pest Control (SPC) program, which is being trialled in 12 reserves across NSW. All volunteers involved in the program will be supervised by NPWS staff and will be trained to the equivalent levels as NPWS staff. All shooting will be conducted according to an approved NPWS shooting operations plan, which includes a Job Safety Analysis (JSA) and a Job Safety Brief (JSB). As part of this process, the program will only take place in sections of reserves that have been closed to the general public. The trial program will help to refine how this additional pest control option can further engage this sector of the community while complementing the programs detailed in the Regional Pest Management Strategies.

Pest management highlights

During 2010–11, Lower North Coast 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 TAP (DEC 2006), the National Plan to Protect Environmental Assets from Lantana (Biosecurity Queensland 2010) and the Biodiversity Priorities for Widespread Weeds) (BPWW) (NSW DPI and OEH 2011) assist the Region's staff 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 since around 2000. A 10-year review of the control strategy has shown that continuing the existing annual program is required to prevent expansion of Scotch broom infestations.

Since around 2010, there has been an extensive strategic and cooperative cross-tenure bitou bush control program in the Great Lakes Area, employing aerial and ground-based spraying. This program has successfully treated widespread infestations of bitou bush, reducing the impacts of this weed across the coastline. Combined with other bitou bush aerial spraying programs along the Hunter coastline, in 2010–11 approximately 50 km of primary and follow-up control was undertaken.

Long-term rainforest regeneration programs in Wingham Brush, Lansdowne, Kattang and Coocumbac Island nature reserves and Sea Acres National Park in Manning-Hastings Area have been aimed at protecting the remaining Lowland Rainforest in NSW North Coast and Sydney Basin Bioregion in the Hastings and Manning valleys. These reserves protect more than 90% of this EEC and ongoing weed control has been successful in protecting the biodiversity of these sites.

Biocontrol agents have been released for a number of weed species, including bitou bush, blackberry, bridal creeper, cat's claw creeper, Madeira vine, mistflower, prickly pear and Scotch broom. New agents are released as they become available.

Pest issues in the rural areas of the Manning catchment are associated with impacts from vertebrate pests. Aerial- and ground-baiting programs coordinated with neighbours and the Mid-coast, New England, Cumberland and Central North LHPAs reduce populations of wild dogs, foxes and feral pigs in key areas including Barrington Tops, Curracabundi and Biriwal–Bulga national parks.

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.

Long-term vegetation monitoring plots have been established to measure the response of bitou bush (Tomaree National Park) and lantana (Columbey National Park) to weed management, as well as 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 universities, government agencies and weeds and pest animals cooperative research centres.

3 Regional prioritisation

The following key factors are considered when determining priorities for pest management within the Region. However, a precautionary approach using risk management will be applied where there is uncertainty about the impacts of the pest on 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 or communities. These include the highest priorities identified in the threat abatement plans (TAPs), Priorities Action Statements (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), and 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, and 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 control of asparagus fern in Saltwater National Park, and 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 in 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.

M-II (Isolated Infestations)

Programs addressing isolated infestations of highly invasive pest species, widely distributed in other parts of the Region, with high potential for future impacts on park values.

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.

In some circumstances, new programs may be introduced, or priority programs extended to target pests where a control window of opportunity is identified. These may arise 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.

4 Prioritised regional pest programs

Live versions of this table will be kept on OEH intranet and updated annually over the five year period of the strategy. Sites are listed in order of priority category, management area, target species and then reserve.

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of control	Action	Priority
Barrington Tops	Barrington Tops NP	Sharpes Creek, Gloucester River, Dilgry River, Little Manning River	Amphibian chytrid fungus	*Mixophyes balbus, Litoria davisae*	Asset protection	Monitor	C-TSC
Barrington Tops	Curracabundi NP	525 – Tuggalo (roadsides and trails, creeklines)	Blackberry	*Austrostipa* grasslands and riparian vegetation (BPWW – CC5)	Asset protection	Ground spray	C-TSC
Barrington Tops	Barrington Tops NP	Barrington Plateau	Blackberry *(Rubus anglocandicans)*	Montane Peatlands and Swamps EEC, broad-toothed rat, threatened orchid species on edges of swamps	Asset protection	Ground spray	C-TSC
Barrington Tops	Watchimbark NR	Roadsides and trails, wet gullies, Watchimbark Creek	Crofton weed *(Ageratina adenophora)*, mistflower, lantana, moth vine	*Cynanchum elegans, Senna acclinis, Grevillea obtusifolia, Thesium australe* Head of catchment	Asset protection	Ground spray, bush regeneration	C-TSC
Barrington Tops	Barrington Tops NP	Barrington Tops	Feral pig	Montane Peatlands and Swamps EEC, broad-toothed rat, threatened orchid species on edges of swamps	Asset protection	Trapping, aerial shooting	C-TSC
Barrington Tops	Curracabundi NP, Woko NP	Barnard River	Fox	Brush-tailed rock-wallaby	Asset protection	Biannual baiting	C-TSC
Barrington Tops	Barrington Tops NP	Barrington Tops	Fox	Broad-toothed rat	Asset protection	Monitor, ground baiting	C-TSC
Barrington Tops	Curracabundi NP	Barnard River	Goat	Brush-tailed rock-wallaby	Asset protection	Monitor, trapping and removal	C-TSC
Barrington Tops	Barrington Tops NP	Barrington Plateau	Horse	Montane Peatlands and Swamps EEC, broad-toothed rat, threatened orchid species on edges of swamps, public safety	Asset protection	Monitor, trapping and removal	C-TSC

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of control	Action	Priority
Barrington Tops	Columbey NP	491 – Southern Block	Lantana	Lower Hunter Spotted gum Ironbark EEC (BPWW – CC3)	Asset protection	Monitor, ground spray	C-TSC
Barrington Tops	The Glen NR	550 – Wards Creek	Lantana	*E. fergusonni* subsp*. fergusonni, E. largeana* (rare or threatened Australian plant), wet sclerophyll forest (BPWW – CC3)	Asset protection	Monitor, ground spray	C-TSC
Barrington Tops	Woko NP	572 – Woko Camping Area	Lantana, moth vine, Cape ivy *(Delairea odoratal)*	Floodplain Rainforest, *Cynanchum elegans*, Southern limit of *Elatostema stipitatum*, *Guilfoylia monostylis* (BPWW – CC1)	Asset protection	Ground spray, bush regeneration	C-TSC
Barrington Tops	Black Bulga SCA	279 – Head of reserve (north half), roadsides and trails	Mistflower *(Ageratina riparia),* lantana *(Lantana camara)*	Sub-tropical Coastal Floodplain Forest EEC, *Senna acclinis* (BPWW – CC1)	Asset protection	Ground spray	C-TSC
Barrington Tops	Copeland Tops SCA	Hidden Treasure carpark and Bowman cleared area	Moth vine *(Araujia sericifera)*	*Eucalyptus largeana* (rare or threatened Australian plant), Sydney Blue Gum Forest, aesthetic presentation of the carpark	Asset protection	Bush regeneration	C-TSC
Barrington Tops	Barrington Tops NP	333 – Little Murray Swamp	Scotch broom	Montane Peatlands and Swamps EEC, broad-toothed rat, threatened orchid species on edges of swamps (BPWW – CC1)	Asset protection	Ground spray, cut and paint	C-TSC
Barrington Tops	Barrington Tops NP	301 – Junction Pools	Scotch broom	Montane Peatlands and Swamps EEC, broad-toothed rat, threatened orchid species on edges of swamps (BPWW – CC1)	Asset protection	Ground spray, cut and paint	C-TSC
Barrington Tops	Barrington Tops NP	Site 234 Edwards Swamp	Scotch broom	Montane Peatlands and Swamps EEC, broad-toothed rat, threatened orchid species on edges of swamps (BPWW – CC1)	Asset protection	Ground spray, cut and paint	C-TSC
Barrington Tops	Barrington Tops NP	363 – Nolans Swamp	Yorkshire fog *(Holcus lanatus),* Scotch broom *(Cytisus scoparius)*	Montane Peatlands and Swamps EEC, broad-toothed rat, threatened orchid species on edges of swamps (BPWW – CC1)	Asset protection	Ground spray, cut and paint	C-TSC

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of control	Action	Priority
Great Lakes	Myall Lakes NP	555 – Waterways of the Myall Lakes	Aquatic weeds eg *Salvinia molesta* (past infestation via Boolambayte Creek), *Cabomba caroliniana* (dams adjacent in catchment)	Freshwater Wetlands on Coastal Floodplains EEC, Ramsar wetlands (coastal brackish lagoons, permanent rivers/creeks/streams) (BPWW – CC1)	Asset protection	Spray, physical removal	C-TSC
Great Lakes	Booti Booti NP	164, 466 – Booti Hill	Bitou bush *(Chrysanthemoides monilifera)*, lantana*, Senna pendula,* morning glory *(Ipomoea* spp.*)*, Formosan lily *(Lilium formosanum)*	*Themeda* Grassland on Seacliffs and Coastal Headlands, Littoral Rainforest EECs, *Syzygium paniculatum*, *Persoonia katerae*, coastal woodland/forest, coastal scrub (BPWW – CC1)	Asset protection	Aerial and ground spray, bush regeneration	C-TSC
Great Lakes	Myall Lakes NP	Shores of the Bombah Broadwater (including Mungo Brush) and Nerong Creek	Bitou bush, climbing asparagus, pampas grass (*Cortaderia selloana*), lantana*, Senna pendula,* passionfruit, coral tree, slash pine (*Pinus elliottii*), prickly pear, black-eyed Susan (*Thunbergia alata*)	Littoral Rainforest, Swamp Sclerophyll Forest, Swamp Oak Floodplain Forest, Freshwater Wetlands on Coastal Floodplains EECs, *Cynanchum elegans*, *Syzygium paniculatum*, *Senna acclinis*, Ramsar wetlands (tree and shrub dominated wetlands) (BPWW – CC1)	Asset protection	Ground spray, bush regeneration	C-TSC
Great Lakes	Darawank NR	360 – Nine Mile Beach	Bitou bush, ground asparagus	Littoral Rainforest EEC, *Chamaesyce psammogeton*, *Persoonia katerae*, frontal dune complex, coastal sand dune complex, coastal scrub (BPWW – CC1)	Asset protection	Ground spray, bush regeneration	C-TSC
Great Lakes	Booti Booti NP	470 – Seven Mile Beach and Janie's Corner	Bitou bush, ground asparagus, morning glory, lantana, mother-of-millions (*Bryophyllum* spp.), beach daisy (*Arctotheca populifolia*)	Littoral Rainforest EEC, *Chamaesyce psammogeton*, coastal scrub, dune grasslands, frontal dune vegetation complex (BPWW – CC1)	Asset protection	Aerial and ground spray, bush regeneration	C-TSC

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of control	Action	Priority
Great Lakes	Myall Lakes NP	202 – Coastline from Banksia Green to southern park boundary	Bitou bush, lantana (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) (BPWW – CC1)	Asset protection	Aerial and ground spray, bush regeneration	C-TSC
Great Lakes	Myall Lakes NP	478 – Smith's Lake foreshore and wetlands	Bitou bush, lantana, blackberry, *Senna pendula*	Swamp Sclerophyll Forest, Swamp Oak Floodplain Forest, Freshwater Wetlands on Coastal Floodplains EECs, coastal forest/woodland, Ramsar wetlands (tree and shrub dominated wetlands) (BPWW – CC2)	Asset protection	Ground spray, bush regeneration	C-TSC
Great Lakes	Booti Booti NP	193 – Charlotte Head, (including Shelly Beach)	Bitou bush, lantana, Formosan lily, *Senna pendula,* passionfruit (*Passiflora* spp.)	*Themeda* Grassland on Seacliffs and Coastal Headlands, Littoral Rainforest EECs, coastal woodland/forest, coastal scrub, coastal dune grassland/complex (BPWW – CC1)	Asset protection	Aerial and ground spray, bush regeneration	C-TSC
Great Lakes	Myall Lakes NP	203 – Coastline from Big Gibber to Banksia Green	Bitou bush, lantana, *Senna pendula* (in forests), exotic beach herbs	Littoral Rainforest, *Themeda* Grassland on Seacliffs and Coastal Headlands EECs, *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) (BPWW – CC1)	Asset protection	Aerial and ground spray, bush regeneration, monitor	C-TSC
Great Lakes	Myall Lakes NP	451 – Sandbar to Number One Beach Coastline (Yellowrock/ Bridge Hill)	Bitou bush, lantana, *Senna pendula, Asparagus* spp., prickly pear (*Opuntia stricta*)	Littoral Rainforest, *Themeda* Grassland on Seacliffs and Coastal Headlands EECs, *Syzygium paniculatum*, headland woodland, coastal forest, Ramsar wetlands (sandy and rocky shores) (BPWW – CC1)	Asset protection	Aerial and ground spray, bush regeneration	C-TSC

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of control	Action	Priority
Great Lakes	Myall Lakes NP	521 – Treachery Beach/Yagon Gibber/Submarine and Fiona Beach	Bitou bush, lantana, *Senna pendula,* exotic beach herbs	Littoral Rainforest, *Themeda* Grassland on Seacliffs and Coastal Headlands EECs, *Chamaesyce psammogeton*, *Senecio spathulatus*, *Stackhousia spathulata*, coastal forest/woodlands, coastal scrub, dune grasslands/complex, Ramsar wetlands (tree and shrub dominated wetlands) (BPWW – CC1)	Asset protection	Aerial and ground spray, bush regeneration	C-TSC
Great Lakes	Myall Lakes NP	581 – Yacaaba Headland	Bitou bush, morning glory, lantana	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) (BPWW – CC1)	Asset protection	Aerial and ground spray, bush regeneration	C-TSC
Great Lakes	Booti Booti NP	537 – Wallis Lake Eastern Foreshore	Bitou bush, *Senna pendula,* climbing, ground asparagus, morning glory	Swamp Oak Floodplain Forest, Swamp Sclerophyll Forest on Coastal Floodplains, Littoral Rainforest EECs, *Cynanchum elegans*, *Senna acclinis*, *Corunastylis littoralis, Plectranthus cremnus* (BPWW – CC1)	Asset protection	Ground spray, bush regeneration	C-TSC
Great Lakes	Myall Lakes NP	528 – Upper and Lower Myall River riparian and wetland areas	Bitou bush, slash pine, *Senna pendula,* lantana, morning glory, pampas grass, camphor laurel *Cinnamomum camphora*, coral tree	Littoral Rainforest, Swamp Sclerophyll Forest, Swamp Oak Floodplain Forest, Freshwater Wetlands on Coastal Floodplains, Coastal Saltmarsh EECs, riparian forest, Ramsar wetlands (tree and shrub dominated wetlands; intertidal wetlands) (BPWW – CC1)	Asset protection	Ground spray, bush regeneration	C-TSC

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of control	Action	Priority
Great Lakes	Booti Booti NP	185 – Cape Hawke	Cape ivy, ground asparagus *(Asparagus aethiopicus)*, *Senna pendula,* lantana*,* morning glory, bitou bush	*Themeda* Grassland on Seacliffs and Coastal Headlands, Littoral Rainforest EECs, *Cynanchum elegans*, *Senna acclinis*, *Plectranthus cremnus*, *Cleistanthus cunninghamii*, *Jagera pseudorhus* var. *pseudorhus*, *Monococcus echinophorus*, *Planchonella myrsinifolia*, *Pisonia umbellifera*, coastal woodland/forest, coastal scrub (BPWW – CC1)	Asset protection	Aerial and ground spray, bush regeneration	C-TSC
Great Lakes	Booti Booti NP	235 – Elizabeth Beach	Climbing asparagus (*Asparagus plumosus*), ground asparagus, bitou bush, lantana*, Senna pendula,* morning glory, Formosan lily	Littoral Rainforest EEC, *Syzygium paniculatum*, *Persoonia katerae*, coastal scrub, dune grasslands, frontal dune vegetation complex (BPWW – CC1)	Asset protection	Ground spray, bush regeneration	C-TSC
Great Lakes	Myall Lakes NP	475 – Shores of the Boolambayte Lake, Creek and inshore islands	Climbing asparagus, lantana, bitou bush, moth vine, *Senna pendula,* noogoora burr*,* coral tree, passionfruit, crofton weed	Swamp Oak Floodplain Forest, Swamp Sclerophyll Forest, Freshwater Wetlands on Coastal Floodplains EECs, Ramsar wetlands (tree and shrub dominated wetlands) (BPWW – CC1)	Asset protection	Ground spray, bush regeneration	C-TSC
Great Lakes	Booti Booti NP	271 – Green Point wetlands and *Allocasuarina* habitat	Climbing, ground asparagus, lantana*,* morning glory, bitou bush, *Senna pendula,* wild watsonia *(Watsonia meriana* var*. bulbilifera*)	Freshwater Wetlands on Coastal Floodplains, Swamp Sclerophyll Forest, Swamp Oak Floodplain Forest EECs, *Allocasuarina defungens*, *Allocasuarina simulans*, *Corunastylis littoralis*, *Plectranthus cremnus*, dry heath, wet heath and coastal forest (BPWW – CC1)	Asset protection	Ground spray, bush regeneration	C-TSC
Great Lakes	Booti Booti NP	490, 163 – South Seven Mile Beach Littoral Rainforest	Climbing, ground asparagus, *Senna pendula,* morning glory, blackberry, lantana*,* bitou bush	Littoral Rainforest EEC, *Syzygium paniculatum*, *Cynanchum elegans*, *Persoonia katerae* (BPWW – CC1)	Asset protection	Aerial and ground spray, bush regeneration	C-TSC

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of control	Action	Priority
Great Lakes	Myall Lakes NP	474 – Shores of Myall Lake and inshore islands	Lantana, bitou bush, morning glory, *Senna pendula,* noogoora burr *(Xanthium occidentale),* coral tree (*Erythrina* x *sykesii*)	Littoral Rainforest, Swamp Sclerophyll Forest, Swamp Oak Floodplain Forest, Freshwater Wetlands on Coastal Floodplains EECs, Ramsar wetlands (tree and shrub dominated wetlands) (BPWW – CC1)	Asset protection	Ground spray, bush regeneration	C-TSC
Great Lakes	Myall Lakes NP	457 – Seal Rocks headlands, beaches and rainforest	Madeira vine (*Anredera cordifolia*), climbing, ground asparagus, bitou bush, lantana, *Senna pendula,* mother-of-millions, *Yucca aloifolia*, prickly pear, exotic beach herbs	Littoral Rainforest, *Themeda* Grassland on Seacliffs and Coastal Headlands EECs, *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) (BPWW – CC1)	Asset protection	Aerial and ground spray, bush regeneration, monitor	C-TSC
Great Lakes	Wallis Island, Yahoo Island, Bandicoot Island, Flat Island, Regatta Island, Durands Island, Mill's Island, Coolongolook NRs, and Booti Booti NP	539 -Wallis Lake Islands (Booti, Snake, Earps, Coomba, Black Rocks Pelican, Shepherd and Little Snake islands)	Madeira vine, *Asparagus* spp., bitou bush, crofton weed, pampas grass, coastal morning glory (*Ipomoea cairica*), lantana, *Senna pendula,* Cape ivy	Swamp Sclerophyll Forest on Coastal Floodplains, Swamp Oak Floodplain Forest, Littoral Rainforest, Coastal Saltmarsh, Freshwater Wetlands on Coastal Floodplains EECs, *Asperula asthenes*, coastal forest (BPWW – CC1)	Asset protection	Ground spray, bush regeneration	C-TSC
Hunter Coast	Worimi RP	127– Fern Bay	Bamboo (*Phyllostachys aurea*)	*Eucalyptus parramattensis* ssp. *decadens* (BPWW – CC4)	Asset protection	Ground spray, bush regeneration	C-TSC
Hunter Coast	Tomaree NP	128 – Anna Bay Headland	Bitou bush	*Themeda* Grassland on Seacliffs and Coastal Headlands EEC, Headland Heath (BPWW – CC2)	Asset protection	Ground spray, bush regeneration	C-TSC
Hunter Coast	Tomaree NP	246 – Fishermans Bay	Bitou bush	*Pultenaea maritima (*Coastal bush-pea), headland heath (BPWW – CC2)	Asset protection	Aerial and ground spray, bush regeneration	C-TSC

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of control	Action	Priority
Hunter Coast	Tomaree NP	2646 – Kingsley Beach, Boat Harbour	Bitou bush	Headland heath (Bitou Bush TAP HCR59A Category 1, BPWW CC3)	Asset protection	Aerial and ground spray, bush regeneration	C-TSC
Hunter Coast	Tomaree NP	243 – Fingal Bay (behind beach)	Bitou bush	Freshwater wetlands EEC, Headland heath (BPWW – CC3)	Asset protection	Aerial and ground spray, bush regeneration	C-TSC
Hunter Coast	Tomaree NP	517– Wreck Beach, Stephens Peak	Bitou bush	Headland heath (*Melaleuca groveana*) (Bitou Bush TAP HCR66 Category 2, BPWW – CC3)	Asset protection	Aerial and ground spray, bush regeneration	C-TSC
Hunter Coast	Tomaree NP	245 – Fingal Spit	Bitou bush	Headland heath (*Senecio spathulatus*) (BPWW – CC1)	Asset protection	Aerial and ground spray, bush regeneration	C-TSC
Hunter Coast	Worimi Conservation Lands	Stockton Beach	Bitou bush	*Diuris praecox, Senecio spathulatus, Eucalyptus parramattensis* ssp. *decadens*, foredune spinifex, frontal dune blackbutt-apple forest	Asset protection	Aerial and ground spray	C-TSC
Hunter Coast	Port Stephens in-shore reserves	Biennial shorebird monitoring	Bitou bush, including bush regeneration programs	Migratory shorebirds	Asset protection	Monitor	C-TSC
Hunter Coast	Tomaree NP	Tomaree Headland	Bitou bush, including bush regeneration programs	*Themeda* Grassland on Seacliffs and Coastal Headlands EEC, Headland heath, maintenance of 20+ year program	Asset protection	Aerial and ground spray, bush regeneration	C-TSC
Hunter Coast	Tilligerry NR	505 – Taylor's Beach	Bitou bush, lantana, *Senna pendula,* climbing asparagus	Koala habitat, Swamp Oak Floodplain Forest, Coastal Saltmarsh EECs, Blackbutt forest, mangroves (BPWW – CC1)	Asset protection	Ground spray, bush regeneration	C-TSC

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of control	Action	Priority
Hunter Coast	Myall Lakes NP	171 – Broughton Island	Bitou bush, prickly pear, morning glory, buffalo grass (*Stenotaphrum secundatum*), crofton weed	*Themeda* Grassland on Seacliffs and Coastal Headlands EEC, little penguins – northern limit, headland heath (BPWW – CC1)	Asset protection	Ground spray, bush regeneration	C-TSC
Hunter Coast	John Gould NR	Cabbage Tree Island	Black rat (*Rattus rattus*)	Gould's petrel	Asset protection	Monitor	C-TSC
Hunter Coast	Snapper Island NR	480 – Snapper Island Nature Reserve	Lantana, climbing asparagus	Littoral Rainforest EEC (BPWW – CC3)	Asset protection	Ground spray, bush regeneration	C-TSC
Hunter Coast	Seaham Swamp NR	456 – Seaham Swamp Nature Reserve	Morning glory, blackberry, camphor laurel	Swamp Oak Floodplain Forest, Swamp Sclerophyll Forest EECs, Community cooperative program (BPWW – CC4)	Asset protection	Ground spray, bush regeneration	C-TSC
Hunter Coast	John Gould NR	Cabbage Tree Island	Pest birds (Corvids)	Gould's petrel	Asset protection	Shooting	C-TSC
Hunter Coast	Tilligerry SCA	Tilligerry State Conservation Area	*Pinus* spp.	Koala habitat, Swamp Oak Floodplain Forest, Coastal Saltmarsh EECs	Asset protection	Physical removal	C-TSC
Hunter Coast	Boondelbah NR	162 – Boondelbah Nature Reserve	Prickly pear, morning glory	Gould's petrel, little penguin (BPWW – CC1)	Asset protection	Ground spray, bush regeneration	C-TSC
Hunter Coast	John Gould NR	181 – Cabbage Tree Island – littoral rainforest site	Prickly pear, morning glory	*Pisonia umbellifera*, Littoral Rainforest EEC, Gould's petrel (BPWW – CC2)	Asset protection	Ground spray, bush regeneration	C-TSC
Hunter Coast	Myall Lakes NP	Broughton Island, vegetation monitoring	Rabbit *(Oryctolagus cuniculus*, black rat (*Rattus rattus*), house mouse (*Mus musculus*)	*Themeda* Grassland on Seacliffs and Coastal Headlands EEC, little penguins – northern limit, headland heath	Asset protection	Monitor, baiting	C-TSC
Hunter Coast	Myall Lakes NP	Broughton Island	Rabbit, black rat, house mouse	*Themeda* Grassland on Seacliffs and Coastal Headlands EEC, little penguins – northern limit, headland heath	Asset protection	Monitor	C-TSC

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of control	Action	Priority
Hunter Coast	Myall Lakes NP	Broughton Island, seabird monitoring	Rabbit, black rat, house mouse	*Themeda* Grassland on Seacliffs and Coastal Headlands EEC, little penguins – northern limit, headland heath	Asset protection	Monitor	C-TSC
Hunter Coast	Tomaree NP, Worimi Conservation Lands, Tilligerry NR, Tilligerry SCA, Medowie SCA, Medowie NR, Wallaroo NP, Karuah NP, Karuah SCA, Karuah NR, Moffats Swamp NR, Gir-um-bit NP, Gir-um-bit SCA	Koala Program	Wild dog	Koala population	Asset protection	Ground baiting	C-TSC
Hunter Coast	Corrie Island NR	Corrie Island	Wild dog, fox	Beach nesting shorebirds, including pied oystercatcher	Asset protection	Ground baiting	C-TSC
Manning Hastings	Saltwater NP	319 – Lagoon Dunes and North to Park Boundary	*Asparagus* spp., Cape ivy, mother-of-millions, century plant (*Agave americana*), lantana, prickly pear, bitou bush	Littoral Rainforest EEC (BPWW – CC1)	Asset protection	Ground spray, bush regeneration	C-TSC
Manning Hastings	Crowdy Bay NP	1622 – Crowdy Bay north (Dunbogan Beach)	Bitou bush	Littoral Rainforest EEC, coastal woodland (BPWW – CC1)	Asset protection	Quickspray, backpack	C-TSC
Manning Hastings	Crowdy Bay NP	2694 – Kylies Beach	Bitou bush	Coastal woodland, Littoral Rainforest EEC (BPWW – CC*)	Asset protection	Backpack, quickspray, aerial spray	C-TSC

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of control	Action	Priority
Manning Hastings	Crowdy Bay NP	276 – Harrington – Crowdy Head Rd	Bitou bush	Littoral Rainforest EEC (BPWW – CC1)	Asset protection	Aerial and ground spray, bush regeneration	C-TSC
Manning Hastings	Crowdy Bay NP	482 – South	Bitou bush	Littoral Rainforest EEC, *Ischaemum triticeum*, *Stackhousia spathulata*, *Diuris flavescens*, *Allocasuarina defungens*, *Allocasuarina simulans* (BPWW – CC1)	Asset protection	Aerial and ground spray, bush regeneration	C-TSC
Manning Hastings	Crowdy Bay NP	506 – The Gap – southern end of Crowdy Bay National Park	Bitou bush, *Asparagus* spp.	Littoral Rainforest EEC (BPWW – CC1)	Asset protection	Ground spray, bush regeneration	C-TSC
Manning Hastings	Sea Acres NP	1999 – Tacking Point	Bitou bush, crofton weed, gazania, asparagus fern, winter senna, ochna, giant Parramatta grass (*Sporobolus fertilis*), paspalum, Madeira vine	Littoral Rainforest EEC, *Sophora tomentosa*, *Acronychia littoralis*, *Cynanchum elegans* (BPWW – CC1)	Asset protection	Hand pull, backpack, cut and paint, quickspray	C-TSC
Manning Hastings	Sea Acres NP	2725 – Castaways	Bitou bush, kikuyu, vasey grass	Littoral Rainforest EEC, coastal woodland, high profile (BPWW – CC*)	Asset protection	Backpack, hand pull	C-TSC
Manning Hastings	Crowdy Bay NP	1585 – Cathys Knob	Bitou bush, lantana	Swamp Sclerophyll Forest EEC, core koala habitat (BPWW – CC3)	Asset protection	Quickspray	C-TSC
Manning Hastings	Crowdy Bay NP	1633 – Diamond Head Camp Area	Bitou bush, lantana, coastal morning glory	High profile, coastal woodland, littoral rainforest EEC (BPWW – CC1)	Asset protection	Hand, backpack	C-TSC
Manning Hastings	Crowdy Bay NP	1708 – Humbug Point	Bitou bush, lantana, coastal morning glory	Swamp Oak Forest EEC, Swamp Sclerophyll Forest EEC (BPWW – CC4)	Asset protection	Quickspray, backpack, hand pull, cut and paint	C-TSC
Manning Hastings	Sea Acres NP	1784 – Miners Beach	Bitou bush, lantana, Rhodes grass, broad-leafed paspalum	High profile site, moist eucalypt forest, Lowland Rainforest EEC (BPWW – CC1)	Asset protection	Hand pull, backpack, cut and paint	C-TSC

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of control	Action	Priority
Manning Hastings	Sea Acres NP	2695 – Middle Track Area	Bitou bush, lantana, Rhodes grass, broad-leafed paspalum	High profile site, moist eucalypt forest, Lowland Rainforest EEC (BPWW – CC*)	Asset protection	Hand pull, backpack, cut and paint	C-TSC
Manning Hastings	Sea Acres NP	2696 – Pandanus Shelly Beach South	Bitou bush, lantana, Rhodes grass, broad-leafed paspalum	High profile site, moist eucalypt forest, Lowland Rainforest EEC (BPWW – CC*)	Asset protection	Hand pull, backpack, cut and paint	C-TSC
Manning Hastings	Sea Acres NP	2697 – Shelly Beach Road	Bitou bush, lantana, rhodes grass, broad-leafed paspalum	High profile site, moist eucalypt forest, Lowland Rainforest EEC (BPWW – CC*)	Asset protection	Hand pull, backpack, cut and paint	C-TSC
Manning Hastings	Sea Acres NP	2698 – Lookout Block	Bitou bush, lantana, rhodes grass, broad-leafed paspalum	High profile site, moist eucalypt forest, Lowland Rainforest EEC (BPWW – CC*)	Asset protection	Hand pull, backpack, cut and paint	C-TSC
Manning Hastings	Saltwater NP, Khappinghat NP	531 – Wallabi Point Headland (Saltwater Headland) and Saltwater Beach	Bitou bush, prickly pear, *Asparagus* spp., lantana, *Senna pendula*	Littoral Rainforest EEC, wetlands, *Melaleuca* swamp forest, *Westringia fruticosa* (BPWW – CC1)	Asset protection	Aerial and ground spray, bush regeneration, monitor	C-TSC
Manning Hastings	Sea Acres NP	2699 – Harrys Gully	Bitou bush, senna pendula, paspalum, setaria	Littoral Rainforest EEC, coastal woodland, high profile site (BPWW – CC*)	Asset protection	Hand pull, backpack, cut and paint	C-TSC
Manning Hastings	Woregore NR	1852 – Pelican Island	Bitou bush, turkey rhubarb (*Acetosa sagittata*)	Important bird breeding site (BPWW – CC1)	Asset protection	Quick spray, hand pull	C-TSC
Manning Hastings	Kattang NR	2644 – Fire trail	Black-eyed Susan, asparagus, environmental weeds	Coastal woodland, high profile site (BPWW – CC3)	Asset protection	Backpack, quickspray, crown, hand pull	C-TSC
Manning Hastings	Macquarie NR	2700 – Roto track	Camphor laurel	Moist eucalypt forest, Lowland Rainforest EEC, high profile site (BPWW – CC*)	Asset protection	Cut and paint saplings, foliar spray seedlings	C-TSC

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of control	Action	Priority
Manning Hastings	Off-park, Khappinghat NR, Towibakh NP, Talawahl NR, Crowdy Bay NP	Manning River entrances	Fox	Beach nesting shorebirds (little tern, pied oystercatcher, beach stone-curlew)	Asset protection	Ground baiting	C-TSC
Manning Hastings	Bago Bluff NP	1709 – Hyndmans Creek	Lantana	*Callistemon liearifolius, Senna acclinis*, blackbutt wet sclerophyll forest and rainforest on creeks (BPWW – CC1)	Asset protection	Quickspray, splatter gun, cut and paint, hand pull	C-TSC
Manning Hastings	Kattang NR	2643 – Washhouse Beach	Lantana	Themeda Grassland EEC, *Thesium australe*, coastal woodland (BPWW – 2)	Asset protection	Foliar spray, cut and paint, hand pull	C-TSC
Manning Hastings	Middle Brother NP	2701 – Acacia courtii population	Lantana	*Acacia courtii*, moist eucalypt forest (BPWW – CC*)	Asset protection	Splatter gun, cut and paint, backpack spray, hand pull	C-TSC
Manning Hastings	Dooragan NP	1503 – Dooragan Acacia	Lantana, bitou bush	*Acacia courtii*, moist eucalypt forest, Lowland Rainforest EEC (BPWW – CC2)	Asset protection	Bush regen	C-TSC
Manning Hastings	Dooragan NP	1641 – Lakeside	Lantana, bitou bush	Moist eucalypt forest, Lowland Rainforest EEC	Asset protection	Cut and paint, foliar spray, hand pull	C-TSC
Manning Hastings	Crowdy Bay NP	1894 – Sandy Point	Lantana, coastal morning glory	Swamp Oak Forest EEC, Swamp Sclerophyll Forest EEC (BPWW – CC1)	Asset protection	Quickspray, backpack spray, hand pull	C-TSC
Manning Hastings	Kattang NR	2702 – Perpendicular Point	Lantana, prickly pear, bitou bush, whisky grass, Rhodes grass, setaria, paspalum	Coastal woodland, Themeda Grassland EEC (BPWW – CC*)	Asset protection	Bush regen	C-TSC
Manning Hastings	Kattang NR	2642 – Fishermans Bluff	Lantana, rhodes grass, whisky grass, paspalum, setaria	Coastal woodland, Themeda Grassland EEC (BPWW – CC3)	Asset protection	Backpack, quickspray	C-TSC

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of control	Action	Priority
Manning Hastings	Sea Acres NP	2641 – Lighthouse Road Pacific Drive	Madeira vine, bitou bush, lantana, Rhodes grass	Moist eucalypt forest, Lowland Rainforest EEC (BPWW – CC1)	Asset protection	Scrape and paint, cut and paint, foliar spray, hand pull	C-TSC
Manning Hastings	Coocumbac Island NR	208 – Coocumbac Island Nature Reserve	Madeira vine, cat's claw creeper (*Macfadyena unguis-cati*), lantana, morning glory, *Tradescantia fluminensis*, *Senna pendula,* white passionfruit (*Passiflora subpeltata*)	Lowland Rainforest on Floodplain EEC, mangroves (BPWW – CC1)	Asset protection	Ground spray, bush regeneration	C-TSC
Manning Hastings	Lansdowne NR	327 – Lansdowne Nature Reserve	Madeira vine, cat's claw creeper, lantana, morning glory, *Tradescantia fluminensis*, *Senna pendula,* white passionfruit	Lowland Rainforest on Floodplain EEC (BPWW – CC1)	Asset protection	Ground spray, bush regeneration	C-TSC
Manning Hastings	Wingham Brush NR	568 – Wingham Brush Nature Reserve	Madeira vine, cat's claw creeper, lantana, morning glory, *Tradescantia fluminensis*, *Senna pendula,* white passionfruit	Lowland Rainforest on Floodplain EEC, grey-headed flying-fox colony (BPWW – CC1)	Asset protection	Ground spray, bush regeneration	C-TSC
Manning Hastings	Wingham Brush NR	Wingham Brush	Pest birds (corvids)	Grey-headed flying-fox colony	Asset protection	Shooting	C-TSC
Manning Hastings	Off-park	Manning River entrances	Pest birds (corvids, gulls)	Beach nesting shorebirds (little tern, pied oystercatcher, beach stone-curlew)	Asset protection	Shooting	C-TSC
Manning Hastings	Saltwater NP	Saltwater National Park	Rabbit	Littoral Rainforest EEC, *Syzygium paniculatum*	Asset protection	Monitor, baiting	C-TSC
Manning Hastings	Kattang NR	2703 – Camden Head	Whisky grass, Rhodes grass, bitou bush, lantana, bindii	Coastal woodland, Littoral Rainforest EEC, heath, high profile (BPWW – CC*)	Asset protection	Backpack, hand pull, cut and paint	C-TSC
Manning Hastings	Macquarie NR	2704 – Little Owen	Whisky grass, Rhodes grass, moth vine, lantana, camphor laurel	High profile site, moist eucalypt forest, Lowland Rainforest EEC (BPWW – CC*)	Asset protection	Hand pull, backpack, cut and paint	C-TSC

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of control	Action	Priority
Great Lakes	Myall Lakes NP	Nerong	Horse	Public safety	Asset protection	Monitor, trapping, removal	C-HD
Great Lakes	Myall Lakes NP	Great Lakes WDMP	Wild dog	Public safety	Asset protection	Ground baiting	C-HD
Manning Hastings	Crowdy Bay NP	Crowdy Bay National Park	Wild dog	Public safety	Asset protection	Ground baiting	C-HD
Manning Hastings	Khappinghat NR	Khappinghat National Park	Wild dog	Public safety, predation of stock	Asset protection	Ground baiting	C-HD
Manning Hastings	Talawahl NR	Talawahl Nature Reserve	Wild dog	Public safety	Asset protection	Ground baiting	C-HD
Barrington Tops	Barrington Tops NP/SCA	Barrington Tops	Wild dog	Neighbours' stock	Asset protection	Ground baiting	C-EC
Barrington Tops	Columbey NP	Columbey National Park	Wild dog	Neighbours' stock	Asset protection	Ground baiting	C-EC
Barrington Tops	Copeland Tops SCA	Copeland Tops State Conservation Area	Wild dog	Neighbours' stock	Asset protection	Ground baiting	C-EC
Barrington Tops	Curracabundi NP	Barnard River WDMP	Wild dog	Neighbours' stock	Asset protection	Ground baiting	C-EC
Barrington Tops	The Glen NR	The Glen Nature Reserve	Wild dog	Neighbours' stock	Asset protection	Ground baiting	C-EC
Barrington Tops	Woko NP	Woko National Park	Wild dog	Neighbours' stock	Asset protection	Ground baiting	C-EC
Great Lakes	Ghin-Doo-Ee NP	Great Lakes WDMP	Wild dog	Neighbours' stock	Asset protection	Ground baiting	C-EC
Great Lakes	Wallingat NP	Great Lakes WDMP	Wild dog	Neighbours' stock	Asset protection	Ground baiting	C-EC
Manning Hastings	Barakee NP/SCA	Barakee National Park	Wild dog	Neighbours' stock	Asset protection	Ground baiting	C-EC

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of control	Action	Priority
Manning Hastings	Biriwal-Bulga NP	Biriwal-Bulga National Park	Wild dog	Neighbours' stock	Asset protection	Ground baiting	C-EC
Manning Hastings	Goonook NR	Goonook	Wild dog	Neighbours' stock	Asset protection	Ground baiting	C-EC
Manning Hastings	Queens Lake NR, Crowdy Bay NP, Lake Innes NR, Dooragan NP	Mid Coast LHPA wild dog management plan – SE coastal reserves	Wild dog	Neighbours' stock	Asset protection	Reactive trapping and 1080 baiting with neighbours, survey and monitor, assess and monitor public risk	C-EC
Manning Hastings	Tapin Tops NP	Tapin Tops National Park	Wild dog	Neighbours' stock	Asset protection	Ground baiting	C-EC
Manning Hastings	Werrikimbe NP	Mid Coast LHPA wild dog management plan – Yarras, Birdwood area	Wild dog	Neighbours' stock	Asset protection	Strategic 1080 baiting with neighbours, survey and monitor, CRC co-operative research program	C-EC
Manning Hastings	Biriwal Bulga NP	Mid Coast LHPA wild dog management plan – Biriwal Bulga NP	Wild dog	Neighbours' stock	Asset protection	Strategic trapping and 1080 baiting with neighbours, survey and monitor	C-EC
Barrington Tops	Barrington Tops NP	Phytophthora Exclusion Zone	*Phytophthora cinnamomi*		Containment	Monitor	C-NE

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of control	Action	Priority
Barrington Tops	Barrington Tops NP	Barrington Plateau Roadsides and trails	Ox-eye daisy (*Leucanthemum vulgare*)		Containment	Monitor, ground spray	C-NE
Great Lakes	All Reserves	Great Lakes Area	Cane toad (*Bufo marinus*)		Eradication	Monitor, trapping, mustering, removal	C-NE
Great Lakes	Myall Lakes NP	Seal Rocks	Myrtle rust		Containment	Monitor/ ground spray	C-NE
Hunter Coast	All Reserves	Hunter Coast Area	Cane toad		Eradication	Monitor, trapping, mustering, removal	C-NE
Hunter Coast	Tilligerry SCA	Banksia Grove Village	Water hyacinth (*Eichhornia crassipes*)		Eradication	Physical removal	C-NE
Lower North Coast Region	All Reserves	All Reserves	Myrtle rust		Containment	Monitor	C-NE
Lower North Coast Region	All Reserves	All Reserves	*Phytophthora cinnamomi*		Containment	Monitor	C-NE
Manning Hastings	Lake Innes NR	Lake Innes	Cane toad		Eradication	Respond to reports, hand collection, night survey, public education	C-NE
Manning Hastings	Off-Park, Crowdy Bay NP	Crowdy Bay	Cane toad		Eradication	Monitor, trapping, mustering, removal	C-NE

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of control	Action	Priority
Manning Hastings	Lake Innes NR	Lake Innes	Deer		Containment	Trapping, survey and monitoring	C-NE
Manning Hastings	Queens Lake NR	Queens Lake	Deer		Containment	Survey and monitoring	C-NE
Manning Hastings	Saltwater NP	Hinddunes	Glory lily (*Gloriosa superba*)		Eradication	Investigate, ground spray, monitor	C-NE
Manning Hastings	Saltwater NP	Surfers Car Park	Myrtle rust		Containment	Monitor, spray	C-NE
Manning Hastings	Innes Ruins HS	Innes Ruins Heritage Site	Mysore thorn		Eradication	Splatter gun, foliar spray, hand pull, cut and paint	C-NE
Manning Hastings	Khappinghat NR	Khappinghat Creek	Sharp rush (*Juncus acutus*)		Containment	Ground spray	C-NE
Manning Hastings	Crowdy Bay NP	Pond	Water lettuce (*Pistia stratiotes*), salvinia (*Salvinia molesta*), water hyacinth		Containment	Ground spray, bush regeneration	C-NE
Barrington Tops	Barrington Tops NP	Barrington Plateau	Rabbit	Montane Peatlands and Swamps EEC, broad-toothed rat, threatened orchid species on edges of swamps	Asset protection	Monitor, bait	H-IH
Great Lakes	Myall Lakes NP	The Grandis	Lantana, crofton weed	Heritage and recreational site	Asset protection	Ground spray/ bush regeneration	H-IH
Barrington Tops	Curracabundi NP	Karamea and Monkeycot homestead sites	Climbing asparagus	Cultural heritage sites	Asset protection	Bush regeneration	H-CH
Barrington Tops	Curracabundi NP	Roadsides and trails, creeklines	Lantana	*Austrostipa* grasslands and riparian vegetation	Asset protection	Ground spray	H-CH

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of control	Action	Priority
Hunter Coast	Tomaree NP	516 – Tomaree Headland	Bitou bush, polygala (*Polygala myrtifolia*), *Asparagus* spp.	Cultural heritage sites (BPWW – CC3)	Asset protection	Ground spray, bush regeneration	H-CH
Hunter Coast	Seaham Swamp NR	Quarry site	Mother-of-millions	Cultural heritage site	Asset protection	Ground spray, bush regeneration	H-CH
Manning Hastings	Lake Innes NR	2007 – Innes Ruins Heritage Site	Lantana	High profile historic site, moist eucalypt forest (BPWW – CC3)	Asset protection	Splatter gun, foliar spray, hand pull, cut and paint	H-CH
Barrington Tops	Curracabundi NP	Tuggalo	Horse	Environmental degradation	Asset protection	Monitor, trapping, removal	M-WNH
Barrington Tops	Curracabundi NP	Barnard River	Rabbit	Environmental degradation, protect heritage site	Asset protection	Monitor, baiting	M-WNH
Barrington Tops	Barrington Tops NP	Gloucester River	Bamboo	Potential to spread downstream Gloucester River Campground	Asset protection	Bush regeneration, cut and paint	M-RA
Great Lakes	Booti Booti NP	Great Lakes WDMP	Wild dog	Public safety	Asset protection	Ground baiting	M-RA
Hunter Coast	Tomaree NP	Point Stephens lighthouse precinct	Blackberry, bitou bush	Cultural heritage site	Asset protection	Aerial and ground spray, bush regeneration	M-RA
Hunter Coast	Tomaree NP	Iris Moore Reserve	*Crithmum maritimum*	Day use area	Asset protection	Ground spray, bush regeneration	M-RA
Hunter Coast	Tomaree NP	Iris Moore Reserve, One Mile Beach Hind dunes	Turkey rhubarb	Day use area, regeneration area, beach access	Asset protection	Ground spray	M-RA
Manning Hastings	Kattang NR	Northern carpark	Bindiis, whisky grass, setaria, Rhodes grass, paspalum	High profile, coastal woodland	Asset protection	Backpack, quickspray	M-RA

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of control	Action	Priority
Manning Hastings	Lake Innes NR	1593 – Cattai Plains / Christmas Bells plains	Bitou bush	Coastal woodland, high profile site (BPWW – CC3)	Asset protection	Quickspray	M-RA
Manning Hastings	Crowdy Bay NP	Kylies Beach Camp Area	Bitou bush, lantana, acacia saligna, coastal morning glory	High profile site, coastal woodland, Littoral Rainforest EEC	Asset protection	Hand pull, backpack, cut and paint	M-RA
Manning Hastings	Crowdy Bay NP	Indian Head Camp Area	Bitou bush, lantana, coastal morning glory	High profile site, coastal woodland, Littoral Rainforest EEC	Asset protection	Hand, backpack	M-RA
Manning Hastings	Lake Innes NR	Old Tip Site	Bitou bush, lantana, wild tobacco, Rhodes grass, whisky grass, setaria, vasey grass, crofton weed, giant Parramatta grass	Aesthetic impacts, biodiversity, public health	Asset protection	Mechanical clearing of rubbish, quickspray	M-RA
Manning Hastings	Macquarie NR	Zone 8 west	Camphor laurel	High profile site, moist eucalypt forest, Lowland Rainforest EEC	Asset protection	Cut and paint, foliar spray, hand pull	M-RA
Manning Hastings	Macquarie NR	Zone 8 east	Camphor laurel, ochna, winter senna, Rhodes grass, vasey grass, broad-leafed paspalum, lantana	High profile site, moist eucalypt forest, Lowland Rainforest EEC	Asset protection	Cut and paint, foliar spray, hand pull	M-RA
Manning Hastings	Dooragan NP	Trig station	Crofton weed, vasey grass	High profile visitation site	Asset protection	Quickspray	M-RA
Manning Hastings	Macquarie NR	Zone 6	Lantana	High profile site, moist eucalypt forest, Lowland Rainforest EEC	Asset protection	Cut and paint, foliar spray, hand pull	M-RA
Manning Hastings	Queens Lake NR	Ghost Road East	Lantana	Moist eucalypt forest, Lowland Rainforest EEC	Asset protection	Quickspray, backpack, hand pull	M-RA
Manning Hastings	Queens Lake NR	Queens Lake Picnic Area	Lantana	Moist eucalypt forest, Lowland Rainforest EEC	Asset protection	Quickspray, backpack, hand pull	M-RA

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of control	Action	Priority
Manning Hastings	Macquarie NR	Zone 3-4 Wattle Street	Madeira vine, turkey rhubarb, moth vine, camphor laurel, lantana	High profile, swamp sclerophyll forest, Lowland Rainforest EEC	Asset protection	Scrape and paint, cut and paint, foliar spray, hand pull	M-RA
Manning Hastings	Roto House HS	Roto visitor area	Privets, loquats, ochna, camphor laurel	High profile site, aesthetic values, historic site, moist eucalypt forest, Lowland Rainforest EEC	Asset protection	Backpack spray, cut and paint, hand pull	M-RA
Manning Hastings	Dooragan NP	Road and tracks	Rhodes grass, paspalum, farmers friends, giant Parramatta grass, crofton weed, lantana	Moist eucalypt forest, Lowland Rainforest EEC, high profile site	Asset protection	Quickspray	M-RA
Manning Hastings	Werrikimbe NP	Roadside weeds	Setaria, Rhodes grass, farmers friends, giant Parramatta grass	World heritage area, aesthetic values	Asset protection	Boom and spot spray	M-RA
Manning Hastings	Sea Acres NP	Lighthouse Road carpark	Whisky grass, rhodes grass, bitou bush, lantana	High profile site, coastal woodland	Asset protection	Foliar spray, cut and paint, hand pull	M-RA
Manning Hastings	Macquarie NR	Zone 2	Winter senna, lantana, camphor laurel	High profile site, moist eucalypt forest, Lowland Rainforest EEC	Asset protection	Cut and paint, foliar spray, hand pull	M-RA
Barrington Tops	Curracabundi NP	Barnard River	Deer (various species)	Environmental degradation	Asset protection	Monitor, ground control	M-CP
Barrington Tops	Curracabundi NP	Barnard River	Feral pig	Cross tenure program, environmental degradation	Asset protection	Trapping, aerial shooting	M-CP
Barrington Tops	The Glen NR	Roadsides	Giant Parramatta grass	*E. fergusonni* subsp*. fergusonni, E. largeana* (rare or threatened Australian plant), wet sclerophyll forest	Asset protection	Ground spray	M-CP
Barrington Tops	Curracabundi NP	Barnard Valley – open grasslands east of Bluff Mountain	St John's wort (*Hypericum perforatum*)		Containment	Assess extent of infestation, ground spray	M-CP

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of control	Action	Priority
Great Lakes	Booti Booti NP	Booti Booti National Park	Rabbit	Littoral Rainforest, *Themeda* Grassland on Seacliffs and Coastal Headlands EECs, *Syzygium paniculatum*, *Cynanchum elegans*, *Persoonia katerae*	Asset protection	Monitor, baiting	M-CP
Great Lakes	Myall Lakes NP	Myall Lakes	Rabbit	Littoral Rainforest, *Themeda* Grassland on Seacliffs and Coastal Headlands EECs, *Syzygium paniculatum*, *Cynanchum elegans*, *Persoonia katerae*	Asset protection	Monitor, baiting	M-CP
Hunter Coast	Tomaree NP	Tomaree	Fox	Neighbours' stock	Asset protection	Ground baiting	M-CP
Hunter Coast	Tilligerry SCA	Tilligerry	Rabbit	Cooperative program with Port Stephens Council	Asset protection	Monitor, baiting	M-CP
Hunter Coast	Tomaree NP	Tomaree	Rabbit	Cooperative program with Port Stephens Council	Asset protection	Monitor, baiting	M-CP
Hunter Coast	Worimi Conservation Lands	Worimi Conservation Lands	Rabbit	Cooperative program with Port Stephens Council	Asset protection	Monitor, baiting	M-CP
Manning Hastings	Crowdy Bay NP	Southern Crowdy Bay NP	Fox	Nesting shorebirds	Asset protection	1080 baiting to extend buffer to the north of Fox TAP nest sites st Harrington	M-CP
Manning Hastings	Woregore NR	Pelican Island	Fox	Threatened shorebirds – little tern	Asset protection	Produce site plan, survey, 1080 baiting to protect nest sites	M-CP
Barrington Tops	The Glen NR	Western entrance along Glen Road and around pine plantation	Bridal creeper (*Asparagus asparagoides*)		Containment	Bush regeneration	M-II

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of control	Action	Priority
Barrington Tops	Curracabundi NP	Roadsides and trails, creeklines	Crofton weed, mistflower		Containment	Ground spray	M-II
Barrington Tops	The Glen NR	Roadsides and trails	Ox-eye daisy, Formosan lily, arum lily (*Zantedeschia aethiopica*)		Containment	Monitor, ground spray, bush regeneration	M-II
Barrington Tops	The Glen NR	Pine plantation on Glen Road	*Pinus* spp.		Containment	Physical removal	M-II
Barrington Tops	Watchimbark NR	233 – Eastern End (Watchimbark Creek) (BPWW – CC5)	St John's wort		Containment	Ground spray	M-II
Great Lakes	Myall Lakes NP	Broadwater and Myall River	Parrot's feather (*Myriophyllum aquaticum*)		Containment	Spray, physical removal	M-II
Great Lakes	Myall Lakes NP	Lower Myall River	Slash pine		Containment	Develop and implement control strategy	M-II
Hunter Coast	Boondelbah NR	Boondelbah Nature Reserve	Bitou bush		Containment	Aerial and ground spray, bush regeneration	M-II
Hunter Coast	John Gould NR	Cabbage Tree Island	Bitou bush		Containment	Aerial and ground spray, bush regeneration	M-II
Manning Hastings	Towibakh NR	Towibakh Nature Reserve	Camphor laurel		Containment	Physical removal	M-II
Manning Hastings	Crowdy Bay NP, Khappinghat NR	Coral trees	Coral tree		Containment	Physical removal	M-II

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of control	Action	Priority
Manning Hastings	Crowdy Bay NP	Coopernook Wetlands	Groundsel bush (*Baccharis halimifolia*)		Containment	Aerial spray	M-II
Manning Hastings	Coorabakh NP, Talawahl NR, Tapin Tops NP	Roadsides and trails	Lantana, crofton weed		Containment	Ground spray	M-II
Manning Hastings	Biriwal-Bulga NP, Tapin Tops NP	Pine plantation	*Pinus* spp.		Containment	Develop and implement control strategy	M-II
Manning Hastings	Crowdy Bay NP, Talawahl NR	Pine plantation	*Pinus* spp.		Containment	Develop and implement control strategy	M-II
Manning Hastings	Comboyne NR	1607 – Comboyne privets (BPWW – CC3)	Privets		Containment	Inject, cut and paint, backpack	M-II
Manning Hastings	Khappinghat NR	Arboretum	Non-endemic species including *Eucalytus cloeziana* (Gympie messmate), *Corymbia citriodora* (lemon-scented gum), *E. banksii* (Tenterfield woollybutt), *Pinus taeda* (loblolly pine), slash pine, *P. radiata* (Monterey pine), *P. carribaea* (Caribbean pine), *P. pseudostrobus* (smooth-barked Mexican pine)		Containment	Physical removal	M-II
Barrington Tops	Black Bulga SCA	Roadsides and trails	Crofton weed, lantana		Containment	Ground spray	L-PP
Barrington Tops	Barrington Tops NP	Gloucester Tops roadsides and trails	Crofton weed, mistflower		Containment	Ground spray	L-PP

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of control	Action	Priority
Barrington Tops	Barrington Tops NP	Mt Allan, Burraga roadsides and trails	Crofton weed, mistflower		Containment	Ground spray	L-PP
Barrington Tops	Berrico NR	Roadsides and trails	Crofton weed, mistflower, lantana		Containment	Ground spray	L-PP
Barrington Tops	The Glen NR	Roadsides and trails	Crofton weed, mistflower, lantana	*E. fergusonni* subsp*. fergusonni, E. largeana*, wet sclerophyll forest	Asset protection	Ground spray	L-PP
Barrington Tops	Columbey NP	Roadsides and trails, monitoring site	Lantana		Containment	Ground spray, monitor	L-PP
Barrington Tops	Columbey NP	Herbicide trial site	Lantana		Containment	Monitor	L-PP
Barrington Tops	Copeland Tops SCA	476 – Sleepy Hollow, Broadbents Trails	Lantana, crofton weed	*Eucalyptus largeana* (rare or threatened Australian plant), Sydney Blue Gum Forest, reduce spread through the reserve (BPWW – CC4)	Asset protection	Ground spray	L-PP
Barrington Tops	Monkerai NR	369 – Roadsides and trails	Lantana, garden escapes	Dry to wet sclerophyll forest with gallery rainforest (BPWW – CC5)	Asset protection	Ground spray	L-PP
Barrington Tops	Copeland Tops SCA	Sleepy Hollow Trail and Basin Loop trail	Madeira vine, potato vine		Containment	Bush regeneration	L-PP
Barrington Tops	Barrington Tops NP	William River, Jerusalem Creek biocontrol sites	Mistflower		Containment	Monitor	L-PP
Barrington Tops	The Glen NR	Biocontrol Sites	Mistflower		Containment	Monitor	L-PP
Great Lakes	Booti Booti NP	Booti Booti	Fox	Neighbours' stock	Asset protection	Ground baiting	L-PP
Great Lakes	Myall Lakes NP	Myall Lakes	Fox	Monitor populations and impacts on biodiversity and neighbours	Asset protection	Ground baiting	L-PP

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of control	Action	Priority
Great Lakes	Wallingat NP	Wallingat National Park	Fox	Monitor populations and impacts on biodiversity and neighbours	Asset protection	Ground baiting	L-PP
Great Lakes	Ghin-Doo-Ee NP	263 – Roadsides	Lantana	Access on management trails (BPWW – CC4)	Asset protection	Ground spray, bush regeneration	L-PP
Great Lakes	Myall Lakes NP	Roadsides, access and management trails	Lantana, crofton weed		Containment	Ground spray, bush regeneration	L-PP
Great Lakes	Wallingat NP	Roadsides, access and management trails	Lantana, crofton weed		Containment	Ground spray	L-PP
Great Lakes	Minimbah NR	Minimbah Nature Reserve	Lantana, slash pine, coral tree, narrow-leaved cotton bush (*Gomphocarpus fruticosus*)		Containment	Ground spray, bush regeneration	L-PP
Great Lakes	Myall Lakes NP	Great Lakes WDMP	Wild dog	Neighbours' stock	Asset protection	Ground baiting	L-PP
Hunter Coast	Stormpetrel NR	Stormpetrel	Bitou bush	Migratory shorebirds	Asset protection	Aerial spray	L-PP
Hunter Coast	Tomaree NP	Herbicide trial site	Bitou bush		Containment	Monitor	L-PP
Hunter Coast	Wallaroo NP	Wallaroo National Park	Coral tree		Containment	Physical removal	L-PP
Hunter Coast	Worimi Conservation Lands	Worimi National Park, Regional Park	Coral tree		Containment	Physical removal	L-PP
Hunter Coast	Wallaroo NP	367 – Roadsides and trails (BPWW – CC5)	Lantana		Containment	Ground spray	L-PP

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of control	Action	Priority
Hunter Coast	Worimi Conservation Lands	Adjacent to Worimi Regional Park, State Conservation Area (Fern Bay)	Pampas grass	Foredune *Spinifex*	Asset protection	Ground spray	L-PP
Manning Hastings	Goonook NR, Tapin Tops NP, Barakee NP, SCA	Manning Area	Feral pig	Environmental degradation, neighbouring properties	Asset protection	Trapping, baiting	L-PP
Manning Hastings	Barakee NP and SCA	Barakee National Park	Horse	Environmental degradation	Asset protection	Monitor, trapping, removal	L-PP
Manning Hastings	Biriwal Bulga NP, Crowdy Bay NP, Goonook NR, Killabakh NR, Khappinghat NR, Talawahl NR, SCA, Tapin Tops NP, Wallamba NR	Sites 196, 207, 212, 225, 228, 274, 280, 313, 436, 440, 469, 486, 487, 492, 560, 583	Lantana		Containment	Ground spray	L-PP
Manning Hastings	Khappinghat NP, Talawahl NR, Coorabakh NP	Lantana biocontrol sites	Lantana		Containment	Monitor	L-PP

5 Consultation

This 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 26 August 2011 in the presence of a range of community representatives including members of local councils, LHPAs, NSW Farmers Association, contract bush regeneration teams and several other stakeholder groups. Some of the key issues raised from this forum, referring to the goals and objectives in the state strategy, were the:

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

Workshops were conducted to accurately identify and prioritise pest management programs. The draft strategy went on public exhibition and comments were invited from the community, government agencies and stakeholders.

Throughout the period of this strategy, Lower North Coast Region will continue to engage with stakeholders to ensure the strategy remains current and relevant to the threats and opportunities to control existing and new pest species.

6 Pest species overviews

Information about high profile pests for the 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.[2]

Wild dog (*Canis lupus* sspp.)

Distribution and abundance

Wild dogs are any dogs living in the wild, including feral dogs (*Canis lupus familiaris*) dingos (*Canis lupus dingo*) and their hybrids. Populations of wild dogs (including dingos) occur mainly along the Great Dividing Range, coastal hinterlands and in north-western NSW.

Wild dogs are distributed throughout the Lower North Coast Region (excluding the offshore islands). While populations occur in reserves managed by NPWS, they are distributed across the landscape in all land tenures. Wild dog issues associated with stock predation are ongoing for all land managers.

Impacts

Wild dogs can have significant impacts on livestock, especially sheep. As a result, wild dogs have been declared a pest under the *Rural Lands Protection Act 1998*. Under the Act, managers of controlled land have an obligation to eradicate wild dogs by any lawful method. All land in NSW is identified as controlled land under the current Pest Control Order for Wild Dogs.[3]

Wild dogs can have both positive and negative impacts on biodiversity. Predation by wild dogs can suppress the abundance of herbivores (both native and exotic) which may be important in reducing overgrazing across much of arid and semi-arid Australia. Wild dogs may also suppress other predators (cats and foxes) with benefits for a broad suite of small- to medium-sized ground-dwelling mammals and ground-nesting birds. Conversely, predation by wild dogs may have significant direct impacts on threatened species (for example, koalas at Port Stephens).

The dingo was introduced into Australia from Asia prior to European settlement and hence it is eligible to be listed as a threatened species under the NSW *Threatened Species Conservation Act 1995* (TSC Act). Although the dingo has not been listed as a threatened species, predation and hybridisation by feral dogs (*Canis familiaris*) has been listed as a key threatening process (KTP) under the TSC Act.

In order to balance the need for wild dog control with the conservation of dingoes, the Pest Control Order for Wild Dogs allows the general destruction obligation for lands listed under Schedule 2 of the Order (Appendix 10.3) to be satisfied through the

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[2] www.dpi.nsw.gov.au/agriculture/pests-weeds/vertebrate-pests/general-information/pest-animal-survey
www.environment.gov.au/biodiversity/invasive/publications/humane-control.html
www.invasiveanimals.com
www.environment.gov.au/biodiversity/invasive/ferals/index.html
www.environment.nsw.gov.au/threatenedspecies/KeyThreateningProcessesByDoctype.htm
www.dpi.nsw.gov.au/agriculture/pests-weeds/weeds/profiles
www.weeds.org.au/WoNS
www.rirdc.gov.au/programs/national-rural-issues/weeds/weeds_home.cfm
www.weeds.gov.au
www.dpi.nsw.gov.au/agriculture/pests-weeds/weeds/noxweed

[3] www.gazette.nsw.gov.au/pdfs/2009/11th_September.pdf

preparation of a wild dog management plan with both control and conservation objectives.

Priorities for control

All wild dog control programs require cooperation with neighbours and other land managers. Cooperative wild dog programs are generally undertaken on an annual basis with reactive programs implemented through ongoing communication with neighbours and the LHPA. Wild dog control programs which are undertaken as identified in wild dog management plans include:

- cooperative wild dog control programs undertaken as required, for example where wild dog predation on domestic stock is identified. Cooperative annual and reactive baiting programs will continue to be implemented in Barrington Tops, Biriwal-Bulga, Curracabundi, Myall Lakes and Werrikimbe national parks, and Barrington Tops nature reserve
- annual baiting programs to be undertaken in Karuah and Wallaroo nature reserves, and Medowie State Conservation Area as coordinated by the Port Stephens Feral Animal Committee and LHPA to minimise impacts on koala populations
- reactive programs to be undertaken in all other reserves as required.

Control

Integrated control programs include:

- aerial baiting in 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 includes 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 and aerial baiting flights are recorded.

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

Red fox (*Vulpes vulpes*)

Distribution and abundance

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

Impacts

Predation by red foxes is listed as a KTP under the TSC Act. The introduction of foxes has resulted in a devastating impact on native fauna, particularly among small- to medium-sized (35–5500 g; Burbidge and MacKenzie 1989) 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.

The priority native species and populations identified in the Fox TAP in Lower North Coast Region include the endangered population of broad-toothed rats in Barrington Tops National Park and State Conservation Area, brush-tailed rock-wallabies in Curracabundi and Woko national parks and beach-nesting shorebirds in the Manning Estuary.

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 possible future inclusion in the Fox TAP as priority sites.

Priorities for control

The broad-toothed rat, brush-tailed rock-wallaby and beach nesting shorebird populations have been identified as priority sites in the Fox TAP.

Other cooperative fox control programs are to be undertaken as required, for example where fox predation on domestic stock is identified.

Control

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

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

Monitoring

All treatments will be recorded and information maintained in PWIS.

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-wallabies 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 and published periodically as part of the review of the Fox TAP.

Feral pig (*Sus scrofa*)

Distribution and abundance

Higher densities of feral pigs tend to occur in the plateau area of Barrington Tops National Park and State Conservation Area, than in other parts of the Region. Pig populations at lower densities are found in other reserves including Barakee, Crowdy Bay, Curracabundi, Lake Innes, Werrikimbe and Woko national parks. Isolated individuals have been observed in Myall Lakes National Park, and Karuah and The Glen nature reserves.

Impacts

Predation, habitat degradation, competition and disease transmission by feral pigs is listed as a KTP under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the 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 1992).

In the sub-alpine wetlands of Barrington Tops National Park pigs cause damage to a number of threatened species and EECs through their behaviour and feeding habits (Heinrich and Dowling 2000) and through the spread of the soil-borne pathogen *Phytophthora cinnamomi*. *P. cinnamomi* has also been recorded in Werrikimbe National Park. Infection of native plants by *P. cinnamomi* is listed as a KTP under the TSC Act and the EPBC Act. *P. cinnamomi* may contribute to plant death where there are other stresses present such as waterlogging, drought, and perhaps wildfire.

Priorities for control

Feral pig programs to protect threatened species and EECs in Barrington Tops National Park and State Conservation Area.

Cooperative feral pig control in Curracabundi and Werrikimbe national parks.

Control

Current control programs use ground-based 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 will be recorded and information maintained in PWIS. Information recorded for pigs trapped includes sex, weight and breeding status.

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*)

Distribution and abundance

Rabbit populations are disjunct throughout the Lower North Coast Region. In the urban coastal reserves rabbits persist on the edges using resources in neighbouring properties in Tomaree National Park and Worimi Conservation Lands. Isolated populations also occur in Barrington Tops and Myall Lakes national parks.

Vertebrate pest programs during the last decade have successfully eradicated rabbits, black rats and house mice 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 the EPBC Act and TSC Act.

Feral rabbits occupy a wide range of habitats, including native and modified grasslands, woodland, heath and forest. They 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 Lower North Coast Region. However, populations in the Barrington Tops plateau have the potential to compete for habitat with the endangered broad-toothed rat.

Priorities for control

Control programs in urban areas will be undertaken as part of cooperative programs with local governments and the LHPA.

Control programs will be implemented in areas where rabbit burrowing is causing damage to reserve infrastructure.

Control

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*)

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 area 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 through their dung and coat. On the Barrington Tops plateau feral horses are adversely impacting on threatened flora and fauna species and EECs. They also compete for resources with native species.

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

Priorities for control

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 and State Conservation Area) to reduce risk to vehicular traffic.

Control

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

Monitoring

Populations are monitored using remote sensing and surveillance techniques as appropriate to determine population size, growth, distribution and patterns of behaviour as appropriate.

Feral goat (*Capra hircus*)

Distribution and abundance

Feral goat populations are largely restricted to small disjunct populations on NPWS estate and private land. Scattered populations occur in and around Crowdy Bay, Dooragan and Curracabundi national parks, and Boorganna, Khappinghat, Killarney, Mernot, Monkerai and Queens Lake nature reserves.

Impacts

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

Goats compete with brush-tailed rock-wallabies for habitat and resources in Curracabundi National Park and graze on threatened plant species and EECs in a number of reserves.

Grazing 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.

Priorities for control

Monitor populations and control as required.

Control

Effective control of feral goats requires an integrated approach using several complementary control techniques. In Lower North Coast Region the main control technique is aerial shooting. Landholders adjacent to reserve boundaries are encouraged to reduce feral goat numbers through mustering and trapping; however, the main source of reinvasion is from adjoining properties that undertake little or no control. Therefore, for areas 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, trapping and mustering programs by comparing kills (cull rate compared from shoot to shoot) or captures per unit effort (time).

Feral deer (*Cervus timorensis*, *Dama dama*, *Cervus elaphus*)

Distribution and abundance

Six deer species are known to have formed feral populations in Australia. These are fallow deer (*Dama dama*), red deer (*Cervus elaphus*), sambar deer (*Cervus unicolour*), chital deer (*Axis axis*), rusa deer (C*ervus timorensis*) and hog deer (*Axis porcinus*).

Feral rusa, fallow, chital and red deer are known to occur in Lower North Coast Region, including Lake Innes, Karuah, Queen's Lake and Wallaroo nature reserves, Barrington Tops, Bugan, Curracabundi, Khappinghat and Wallingat national parks, and Barrington Tops state conservation area, and private and Forest NSW lands in the Port Macquarie area. Since around 2007 there has been an observable increase in the number of feral deer in a range of locations.

Impacts

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

Feral deer impact NPWS estate by destroying native plants through trampling, grazing and ringbarking small trees, fouling watercourses, causing soil erosion, spreading weeds and by their potential to transmit animal diseases to livestock. In the Port Macquarie area they have significant impacts on littoral rainforest EECs. Feral deer are known to impact rural properties by browsing on agricultural crops and damaging fences and urban properties where they can destroy garden plants. They can also pose threats to public safety when they stray onto roadways. On the Pacific Highway and local roads around Port Macquarie, feral deer are recorded as causing

up to seven road accidents per year, with the highest incidence occurring in the winter months.

Priorities for control

Continue with strategic and collaborative deer control programs in conjunction with the Mid North Coast Wild Deer Working Group, targeting areas in and around Lake Innes and Queens Lake nature reserves.

Control

A number of techniques are available for the control of feral deer, including shooting by NPWS staff and contractors, trapping using feed-based lures, oral sedation, mustering and Judas control. However, in remote areas and difficult habitat (e.g. wetlands), there are few viable cost-effective options available. Shooting is the most preferred humane option.

Given the current population level of feral deer, there is a window of opportunity to control the population before it expands. However, as the population is widely dispersed, control programs will be labour intensive and require adequate funding and resources.

NPWS works cooperatively with other stakeholders through the Mid North Coast Wild Deer Working Group which formed in 2001 and includes LHPA, Forests NSW, NSW Police, local government, RSPCA, NSW Game Council, Deer Farmers Association, FAWNA, local veterinarians and recreational shooters. The NSW Game Council has formed the Port Macquarie-Hastings Hunting Group who undertake culling of nuisance feral deer off-park in consultation with NSW Police and local RSPCA officers.

Monitoring

The occurrence and distribution of feral deer will be monitored within the Region. Survey results, deer incidents and culling data will be collected and mapped. The Port Macquarie–Hastings Hunting Group will continue to report control efforts. The recording of incidences will be undertaken cooperatively by stakeholder members of the Mid North Coast Wild Deer Working Group.

Feral cat (*Felis catus*)

Distribution and abundance

Feral cats are known throughout most reserves in the Lower North Coast 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 EPBC Act and TSC Act.

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

Priorities for control

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

Control

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 to cats.

Monitoring

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

All control programs will be recorded and information maintained in PWIS.

Crofton weed (*Ageratina adenophora*) and mistflower (*A. riparia*)

Distribution and abundance

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

Impacts

Crofton weed is poisonous to horses and is currently listed as a Control Class 4 noxious weed in four Local Government Areas in Lower North Coast Region (Gloucester, Great Lakes, Greater Taree and Port Macquarie-Hastings) (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 there has been no disturbance.

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

Priorities for control

Treat crofton weed and mistflower in identified BPWW priority 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 weed control programs.

Control

Isolated infestations can be controlled by physical removal or herbicide application by backpack sprayers. Heavier, more extensive infestations are controlled using herbicide applied from vehicle-based spray units. Control of these species is frequently undertaken as part of other weed control programs.

Monitoring

All treatment will be recorded and information maintained in PWIS.

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

Aquatic weeds

This group of weeds consists of:

- *Cabomba caroliniana* (cabomba)
- *Eichhornia crassipes* (water hyacinth)
- *Myriophyllum aquaticum* (parrot's feather)
- *Pistia stratiotes* (water lettuce)
- *Salvinia molesta* (salvinia).

Distribution and abundance

Heavy infestations of cabomba are present in a stormwater drain in Lake Innes Nature Reserve, as well as in off-park drains and creeklines that flow into the reserve.

Water lettuce, salvinia and water hyacinth occur together in a former sand-mining impoundment in Crowdy Bay National Park. There are also salvinia infestations in the western part of Crowdy Bay National Park, in and around Lake Innes Nature Reserve and in a dam within Rawdon Creek Nature Reserve.

There are scattered populations of parrot's feather in the upper Myall River growing in freshwater wetlands of Myall Lakes National Park. Parrot's feather also occurs with cabomba in Lake Innes Nature Reserve.

There are infestations of salvinia, cabomba and sagittaria (*Sagittaria platyphylla*) in the catchment of Myall Lakes. These species threaten the biodiversity of Ramsar wetlands of Myall Lakes National Park. Although not present in reserves in Lower North Coast Region, there is a potential threat of alligator weed (*Alternanthera philoxeroides*) infestations as it is present off-park near Buladelah and is common in the landscape to the south of the Region.

Impacts

Cabomba is an aggressive invader of freshwater systems, particularly if they are nutrient rich. It is a fully submerged aquatic plant that out-competes native freshwater plants and has similar impacts to salvinia. It can impede aquatic recreational activities and drowning is a risk for entangled swimmers. Cabomba is a Class 5 weed under the *Noxious Weeds Act 1993* in all LGAs in Lower North Coast Region. Cabomba is listed as a Weed of National Significance in Australia.

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 current noxious classification of water hyacinth in the LGAs of the Lower North Coast Region varies from Control Class 2 to 4.

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

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

Salvinia is a free-floating aquatic fern which can form dense mats. Plants have central stems 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 and sagittaria are listed as Weeds of National Significance (WoNS) and salvinia varies from Class 2 to 3 in Lower North Coast Region. Salvinia previously infested part of Myall Lakes National Park (NPWS 1999).

Priorities for control

- all aquatic species are being controlled in the sand-mining impoundment in Crowdy Bay National Park. Treatment, which at the time of publication has been effective, will be required for many years due to seed longevity and ongoing germination
- salvinia control in Lake Innes and Rawdon Creek nature reserves
- cabomba and parrot's feather control in Lake Innes Nature Reserve.

Control

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. The following control methods are used:

- cabomba - mechanical removal - all fragments of the weed must be removed; a new herbicide has recently been registered for cabomba control in NSW
- 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 and plants
- parrot's 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 and cabomba infestations in waterways adjacent to the Myall Lakes require constant vigilance to detect incursions into the waterways of the Myall system.

Ad hoc monitoring of waterways in Myall Lakes National Park is undertaken for new incursions of any aquatic weeds and/or spread of parrot's feather.

Monitor and control of new incursions of alligator weed.

Maintain regular liaison with local control authorities – Great Lakes, Greater Taree, Port Macquarie-Hastings and Port Stephens LGAs – to identify new incursions of aquatic weeds in the upper catchments.

Asparagus

Weeds including:

- *Asparagus asparagoides* (bridal creeper)
- *A. aethiopicus* (ground asparagus)
- *A. plumosus* (climbing asparagus).

Asparagus weeds are profiled here separately, rather than in the exotic vine and scramblers profile, due to their widespread impacts in Lower North Coast Region.

Distribution and abundance

Bridal creeper (*A. asparagoides*) grows in isolated infestations in Snapper Island and Wallis Lake Islands nature reserves, and Tomaree National Park.

Ground asparagus (*A. aethiopicus*) forms dense infestations in Saltwater National Park, and scattered infestations occur in Booti Booti, Crowdy Bay, Myall Lakes, Sea Acres and Tomaree national parks, and Darawank, Kattang, Khappinghat, Macquarie and Wallis Lake Islands nature reserves.

Climbing asparagus (*A. plumosus*) forms widespread infestations in Booti Booti National Park, with isolated infestations in Curracabundi and Myall Lakes national parks and Tilligerry and Wallis Lake Islands nature reserves.

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

Impacts

All asparagus weed species have been listed as WoNS.

Bridal creeper is listed as a Class 4 noxious weed in all LGAs in the Lower North Coast 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 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 high priority sites.

Continue control programs targeting asparagus species in Kattang, Macquarie and The Glen nature reserves, Booti Booti, Myall Lakes, Saltwater and Sea Acres 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 sprayers. 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 in PWIS.

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

Bitou bush (*Chrysanthemoides monilifera* ssp. *rotundata*)

Distribution and abundance

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

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

Impacts

Bitou bush is a WoNS and a Control Class 4 noxious weed in three coastal councils in the Lower North Coast Region (Great Lakes, Greater Taree and Port Stephens). The invasion of native plant communities by bitou bush is listed as a KTP under the TSC Act, and the Bitou Bush TAP (DEC 2006) has been successfully implemented since 2006.

Bitou bush is a highly competitive weed that smothers native plants and destroys 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 Lower North Coast Region.

Priorities for control

The Bitou Bush TAP identifies priority sites for control in the Lower North Coast 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:

- Booti Booti National Park – beaches and headlands
- Crowdy Bay National Park – North, South, Diamond Head
- Darawank Nature Reserve – Seven Mile Beach
- Kattang Nature Reserve – headlands
- Myall Lakes National Park – most beaches and headlands
- Saltwater and Khappinghat national parks – Wallabi Point Headland

- Sea Acres National Park – Tacking Point
- Tomaree National Park – Tomaree Headland, Fishermans Bay, Anna Bay Headland, Wreck and Box beaches.

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

Bitou bush is controlled using an integrated approach. Techniques include physical removal, cut-and-paint and herbicide treatment from backpacks and vehicles, and boom- and spot-application from helicopters. Three biocontrol agents – leaf rolling moth (*Tortrix* spp.), tip moth (*Comostolopsis germana*) and seed fly (*Mesoclanis polana*) have effectively established in all coastal reserves. NPWS has an off-label permit for the aerial application of herbicide.

Monitoring

Monitoring of the success of bitou bush control programs at sites in Tomaree, Khappinghat and Myall Lakes national parks using methods outlined in the TAP monitoring guidelines continues. Information is 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 in PWIS.

A permanent monitoring site has been established in Tomaree National Park to further understand the demography of bitou bush invasion and native plant rehabilitation following control.

Scotch broom (*Cytisus scoparius*)

Distribution and abundance

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

Impacts

Scotch broom is listed as a WoNS and a KTP under the TSC Act.

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

The Barrington Tops plateau has a large number of endemic plant species including threatened species and the Montane Peatlands and Swamps EEC. Scotch broom provides unsuitable habitat for a number of threatened mammal populations including the endangered populations of the broad-toothed rat.

Priorities for control

Removal of all plants within the subalpine wetlands, including 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

Control is via a combination of removal of seedlings and cut-and-paint for isolated infestations in and around subalpine wetlands. Other areas are treated with herbicide applied from vehicle-mounted spray units.

Four biological control agents have been released: 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 been released and become established. All biocontrol agents have had minimal success in reducing the growth of Scotch broom.

Monitoring

All treatment will be recorded and information maintained in PWIS.

Mapping of the distribution and abundance was undertaken in 1989, 1999 and 2009. This information indicates the effectiveness of containment over a 10-year period (Odom et al. 2003) and is used to review and update the Scotch broom containment strategy.

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

Coastal environmental weeds (including beach herbs)

These weeds include:

- *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)
- *Watsonia meriana* var. *bulbilifera* (wild watsonia).

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 prevalent in Macquarie and Towibakh nature reserves. Isolated groupings of coral trees are located in a number of coastal reserves, many associated with prior land use. Sharp rush is in Khappinghat Nature Reserve, Tilligerry State Conservation Area and Worimi National Park. Formosa lily is most common in reserves adjacent to villages and urban areas in Manning-Hastings 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 is in One Tree Island Nature Reserve. Senna is widespread in most coastal reserves, with the heaviest infestations found in the reserves in the Great Lakes and Manning-Hastings Areas. Wild watsonia occurs in Booti Booti and Myall Lakes national parks.

Beach daisy (*Arctotheca populifolia*), sea rocket (*Cakile edentula*), samphire *Crithmum maritimum*), sea holly (*Eryngium maritimum*) and pennywort (*Hydrocotyle bonariensis*) 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 (for example wild watsonia) and seed is distributed into bushland reserves by birds or through refuse dumping. At some sites these weed species, such as senna, are secondary invaders 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).

Priorities for control

Treat all coastal environmental weeds in identified BPWW high priority sites.

Treat groundsel bush in Crowdy Bay National Park in collaboration with adjoining landowners and Greater Taree City Council.

Investigate the extent of sharp rush 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 Conservation Lands.

Continue control of polygala in Tomaree National Park, and investigate the extent of infestation and possibility of its control on One Tree Island Nature Reserve.

Control

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

Monitoring

All treatment of coastal environmental weeds will be recorded and information maintained in PWIS. New weed incursions will be mapped and controlled were possible.

Exotic herbs

These weeds include:

- *Asystasia gangetica* ssp. *micrantha* (Chinese violet)
- *Bryophyllum* species (mother-of-millions)
- *Hypericum perforatum* (St John's wort)

- *Leucanthemum vulgare* (ox-eye daisy)
- *Xanthium* spp. (burrs).

Distribution and abundance

Chinese violet grows in and adjacent to Tomaree National Park at Boat Harbour and One Mile Beach. Isolated plants also occur in Tilligerry State Conservation Area. Mother-of-millions (*Bryophyllum delagoense* and *B*. x *houghtonii*) is scattered in a few coastal reserves. St John's wort occurs as an isolated infestation in Curracabundi National Park, where the adjoining private property has a widespread infestation. Ox-eye daisy is found along roads and trails in Barrington Tops National Park and State Conservation Area, and isolated plants occur along trails in The Glen Nature Reserve. Burrs occur in a number of reserves throughout the Region including Curracabundi, Myall Lakes, Watchimbark and Woko national parks, and Worimi Conservation Lands. Burrs occur most frequently along recently disturbed tracks and trails.

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. It is a Class 3–4 noxious weed in all LGAs of Lower North Coast Region. 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 and St John's wort are largely a result of the past agricultural land use. 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 Lower North Coast Region.

Priorities for control

Treat all exotic herbs identified in BPWW priority sites.

Identify and treat Chinese violet in Tomaree National Park in coordination with Port Stephens Council.

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.

Control

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.

Monitoring

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

Exotic and pasture grasses

These weeds include:

- *Andropogon virginicus* (whisky grass)
- *Cortaderia* species (pampas grass)
- *Holcus lanatus* (Yorkshire fog)
- *Melinis minutiflora* (molasses grass)
- *Pennisetum clandestinum* (kikuyu)
- *Paspalum* species
- *Sporobolus fertilis* (giant Parramatta grass)
- *Stenotaphrum secundatum* (buffalo grass).

Distribution and abundance

Exotic perennial grasses occur in all reserves throughout the Region. The 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, particularly disturbance associated with sand mining. Pampas grass infestations are scattered throughout the hind-dunes 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 subalpine plateau displacing native species along roadsides and along the creek lines at Nolans Swamp in Barrington Tops National Park and State Conservation Area. Molasses grass is present in dense infestations in disturbed areas in Crowdy Bay National Park. *Paspalum* species occur in many reserves, and are 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 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 has 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 EEC Montane Peatlands, habitat for the endangered broad-toothed rat and a number of other threatened plant species.

Priorities for control

- Treat infestations identified in BPWW priority sites
- 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 subalpine plateau of Barrington Tops National Park

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

Control

A variety of control techniques can be used for controlling grasses, including physical removal of isolated clumps or herbicide spot-spraying from a vehicle-mounted spray unit or herbicide application using a 'rope wick' applicator. The risk of using herbicides is the potential impact on 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 in PWIS.

Exotic vines and scramblers

These weeds include:

- *Acetosa sagittata* (turkey rhubarb)
- *Anredera cordifolia* (Madeira vine)
- *Araujia sericifera* (moth vine)
- *Caesalpinia decapetala* (Mysore thorn)
- *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* (trad).

Asparagus weeds have been profiled separately due to their widespread impacts in Lower North Coast Region.

Distribution and abundance

Turkey rhubarb is restricted to a few reserves in the Region, including Macquarie and Woregore nature reserves. Madeira vine infestations are widespread on Coocumbac Island, Lansdowne and Macquarie nature reserves, Sea Acres National Park and homestead areas of Curracabundi National Park and State Conservation Area. Minor infestations occur in other reserves. Moth vine is present in reserves across the Region. Dense infestations grow along Watchimbark Creek in Watchimbark Nature Reserve. Mysore thorn has a limited distribution in the region, with a major infestation that occurred in and around the Innes Ruins Historic Site. Here it originated as a garden cultivar and ornamental shrub planted by Major Innes' wife in the 1830s as part of the Innes Homestead gardens. Mysore thorn has been the target of an intensive control program within the "Ruins" area since late 1980s, with the infestation now reduced to maintenance level.

Dolichos pea is restricted to Tomaree National Park, Worimi Conservation Lands and Broughton Island (Myall Lakes National Park). In late 2011, a small infestation of glory lily was detected and promptly controlled in Tomaree National Park. It is present on lands adjacent to Darawank Nature Reserve and Khappinghat National Park; at this stage it has not been recorded within these parks. Major infestations of both morning glory species occur on Coocumbac Island and Macquarie nature reserves 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. Trad infestations are limited to rainforest and moister locations, mostly along the coastal fringe; trad 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. Madeira vine, cat's claw creeper and asparagus weeds have all been listed as WoNS. Turkey rhubarb is a prolific seeder and it grows up and through understorey vegetation and can be a major problem on sand dunes. 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.

Priorities for control

Treat all exotic vines and scramblers in identified BPWW high priority sites.

Investigate the possible infestation of glory lily in Khappinghat National Park.

Maintain treatment of morning glory and white passionfruit infestations on John Gould and Boondelbah nature reserves (offshore islands) in the vicinity of Gould's petrel habitat.

Control

A variety of techniques can be used 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. New biocontrol agents for Madeira vine and cat's claw creeper have been recently released on infestations in the Region.

Monitoring

All treatment will be recorded and information maintained in PWIS.

Monitor to prevent establishment of glory lily in Lower North Coast Region reserves by communicating with local government weeds control officers and through visual inspections of high risk sites.

Lantana (*Lantana camara*)

Distribution and abundance

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

Impacts

Lantana is a WoNS and a Control Class 4 noxious weed in all LGAs of Lower North Coast 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 Lower North Coast Region, lantana infestations impact on EECs such Littoral Rainforest, Swamp Oak Floodplain Forest and Swamp Sclerophyll Forest, and a number of threatened species.

Priorities for control

Control lantana at high priority sites identified in BPWW.

Continue control programs in Black Bulga and Copeland Tops state conservation areas, Berrico, Kattang and Snapper Island nature reserves, and Bago Bluff, Columbey, Crowdy Bay, Curracabundi, Dooragan, Middle Brother, Wallaroo and Wallingat national parks.

Control

Physically remove seedlings and use cut-and-paint technique for isolated infestations in sensitive environments. Apply herbicide using a splatter gun, backpack sprayer, or a vehicle-mounted spray unit for heavy infestations.

A number of lantana biocontrol agents have been released across the Lower North Coast 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 and Khappinghat national parks and Talawahl Nature Reserve.

An annual monitoring program (5 x 10 square 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 to further understand lantana invasion and native plant rehabilitation following control.

Blackberry (*Rubus anglocandicans*)

Distribution and abundance

Blackberry occurs throughout the Region. In coastal reserves such as Kattang, Myall Lakes and Tomaree national parks isolated plants occur but are less invasive than other coastal weeds. Widespread infestations occur in inland reserves, particularly Barrington Tops, Curracabundi, Werrikimbe and Woko national parks, Camels Hump and Khatambuhl nature reserves, 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 Lower North Coast Region.

Blackberry can thrive in a range of habitats and invades the banks of watercourses, roadsides, open forest and subalpine areas. Blackberries can impede access, provide habitat suitable for introduced species, and treated plants provide increased fire fuels, thereby 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).

Priorities for control

Treat blackberry at sites identified in BPWW as priority sites. Blackberry in Barrington Tops national park directly impacts on threatened species and EECs and control in this reserve is a priority.

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

Control

Integrated control techniques are used and include treatment of blackberry with 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, which has established in the Barrington Tops National Park, reduces fruit and seed on the plant (NSW DPI 2009).

Monitoring

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

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

Woody weeds

These weeds include:

- *Ailanthus altissima* (tree of heaven)

- *Ligustrum lucidium* (large-leaved privet)
- *Ligustrum sinense* (small-leaved privet)
- *Pinus elliottii* (slash pine)
- *Pinus radiata* (radiata pine)
- *Rosa rubiginosa* (sweet briar).

Distribution and abundance

Tree of heaven is present in Curracabundi National Park. Privet species occur mostly along creeklines of inland reserves in a range of vegetation communities, including Bridal Veil Falls Nature Reserve and State Conservation Area, and Boorganna, Comboyne and Macquarie nature reserves. Major pine infestations occur as dense stands and individual wildlings that have spread from plantations and other plantings in or adjacent to reserves, for example in Cottan-Bimbang, Crowdy Bay, Myall Lakes and Werrikimbe national parks and The Cells State Conservation Area. Sweet briar is present in both Curracabundi National Park and Watchimbark Nature Reserve..

Impacts

Woody weeds can be invasive in native plant communities and in some areas they can dominate; restricting natural regeneration and the expansion of rainforest and other forest types, for example privet species in Comboyne Nature Reserve. In Curracabundi National Park some of these weeds were planted and now prevent the reestablishment of native species, adversely impact on existing native vegetation remnants. Control programs, particularly for tree of heaven, must consider the impact of removal on stream bank stability.

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.

Priorities for control

Treat all woody weeds at sites identified in BPWW priority sites.

Monitor areas where control previously has been undertaken in Barrington Tops National Park; control as required.

Treat isolated tree of heaven and sweet briar in Curracabundi National Park.

Control

Woody weeds are either controlled as part of larger scale bush regeneration programs undertaken in all reserves, or single-species focused where significant infestations of a single species occurs; particularly where they threaten the conservation values of that area or reserve.

Specific control techniques vary depending on the individual weed species, however, most woody weed trees are controlled through stem-injection, for example tree of heaven or in some cases cut, scrape and paint with herbicide. Woody shrub species may also be controlled through foliar spraying with herbicide or physical removal. Follow up control of seedlings and regrowth generally consists of foliar spraying, or hand removal of isolated plants.

Monitoring

Control program results will be recorded and maintained in PWIS.

Eucalypt dieback associated with over-abundant psyllids and bell miners

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 Lower North Coast 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 Lower North Coast Region. 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. Koalas, greater, squirrel and yellow-bellied gliders, and brush-tailed phascogales may all be at risk of decline due to poor forest health.

Priorities for control

No priorities for control have yet been identified within Lower North Coast Region. Monitoring of susceptible ecosystems and known areas of BMAD are the primary goals of managing BMAD within the Region.

Control

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.

Plant pathogen (*Phytophthora cinnamomi*)

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 Lower North Coast Region.

Impacts

Infection of native plants by *Phytophthora cinnamomi* has been identified as a KTP 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 2008).

Phytophthora cinnamomi is the most widespread and destructive of the 32 *Phytophthora* species in Australia and is listed as KTP 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 (for example waterlogging, drought, and wildfire).

Priorities for control

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. Provide boot-washing stations for bush-walkers at appropriate points around the quarantine area in Barrington Tops National Park.

Use installed wash-down facilities for equipment within the infected areas.

Control

Control is by containment through the use of quarantine areas, signage and hygiene facilities. Protect key areas through signage and hygiene facilities placed before entry points. Treatment of key individual plants is possible.

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

Monitoring

Monitor vegetation in key locations to determine impacts on vegetation and key species.

Test soil samples in areas adjoining containment boundaries to monitor any Phytophthora movement.

Check dieback in known areas.

Test soil and monitor ecosystems in Watchimbark National Park for signs of early infestation to enable timely treatment.

Myrtle rust (*Uredo rangelii*)

Distribution and abundance

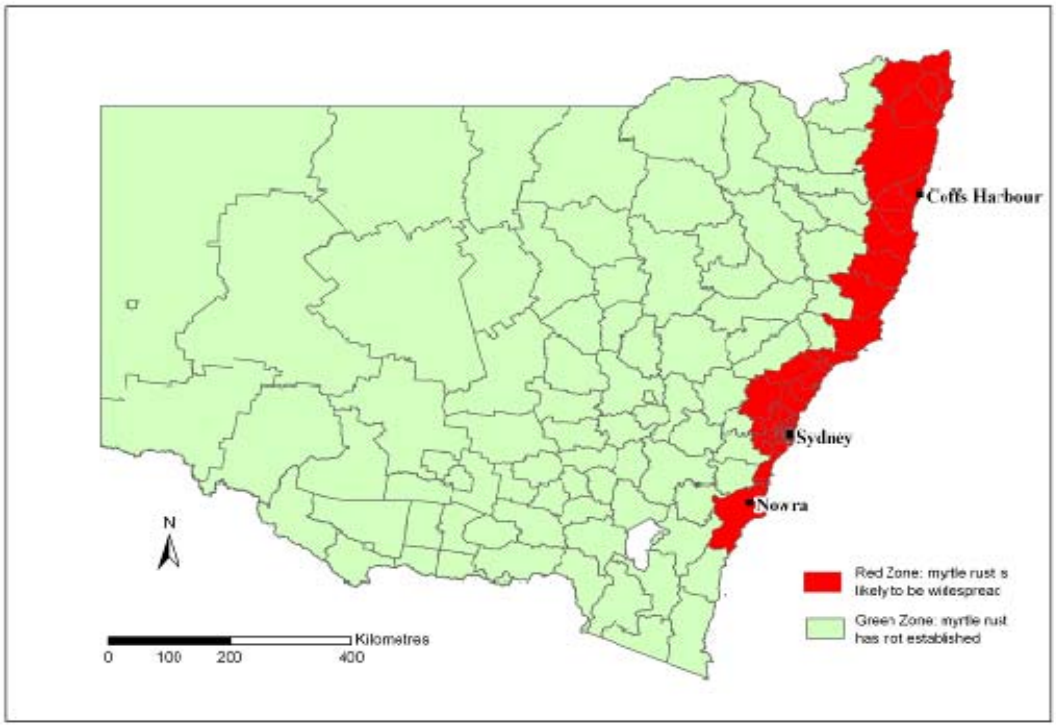
Myrtle rust is a plant disease caused by the exotic fungus *Uredo rangelii*. It was first detected in Australia on 23 April 2010 on the Central Coast. It has established in coastal NSW from the Clyde River north into Queensland. Myrtle rust is likely to spread rapidly to the extent of its biological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

Myrtle rust 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.

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.



Approximate distribution of myrtle rust *Uredo rangelii* as of 24 January 2011.

Data from NSW Department of Primary Industries (www.dpi.nsw.gov.au/biosecurity/plant/myrtle-rust); local government boundaries from the Land and Property Management Authority.

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 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:

- slow the establishment of myrtle rust on national park estate
- minimise the impacts of myrtle rust on threatened species and ecological communities on national park estate.

Control

The plan includes eight action areas to manage myrtle rust on 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.

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 be 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 data are taken of work sites, including the extent of myrtle rust distribution and control implemented. Sites are revisited periodically for follow-up treatment and maintenance.

Appendix 1 New and emerging pest species

New pest species

Any suspected new pest species in the Region should first be reported to the Regional Pest Management Officer, who will then decide if it is necessary to alert the following groups.

Species	Contact	Website
All species	Report sightings to Wildlife Atlas.	www.environment.nsw.gov.au/wildlifeatlas/about.htm#contribute
All species	Regional Invasive Species Officer (DPI) (see website for contacts).	www.dpi.nsw.gov.au/__data/assets/pdf_file/0004/345280/RWACs-ISO-contacts-map.pdf
Animal diseases	Emergency Animal Disease Hotline (DPI) – report unusual disease signs, abnormal behaviour or unexplained deaths in livestock. Ph: 1800 675 888	www.dpi.nsw.gov.au/biosecurity/animal
Aquatic pests	Aquatic Pest Hotline (DPI) – report suspected aquatic pests or weeds. Ph: (02) 4916 3877	www.dpi.nsw.gov.au/biosecurity/aquatic
Insects and plant pests/ diseases*	Exotic Plant Pest Hotline (DPI) – report suspect exotic and emergency insects and plant pests/diseases. Ph: 1800 084 881	www.dpi.nsw.gov.au/biosecurity/plant
Pest animals	Website form available for the reporting of new incursions of pest animals.	www.dpi.nsw.gov.au/agriculture/pests-weeds/vertebrate-pests/other-vertebrate-pests2/pest-reporting/pest-reporting-form
Weeds**	Notify relevant Local Control Authority and Weeds Hotline (DPI). Ph: 1800 680 244 Email: weeds@dpi.nsw.gov.au	http://www.dpi.nsw.gov.au/agriculture/pests-weeds/weeds/contacts

* Certain diseases and pests are notifiable for the purposes of the *Plant Diseases Act 1924*. For example, red imported fire ant has been made notifiable under this Act. This means that you have a legal obligation to report suspected red fire ant infestations as soon as possible.

** Noxious Weeds in Control Classes 1, 2 and 5 are notifiable weeds under the *Noxious Weeds Act 1993.* This means that you must notify the local control authority within 3 days of becoming aware that the notifiable weed is on the land.

Emerging pest species

In Lower North Coast Region, there are a number of weeds and pest animals that pose a risk of invasion and/or further spread and establishment. Those listed below are not currently known to exist in reserves, exist in small isolated infestations or are only in a small number of reserves. These species, the locations of current infestations and/or possible reserves where infestations may establish are discussed below. Any new occurrences of these pests, outside of the areas on-park mentioned below, should be reported to the Regional Pest Management Officer, who will decide the appropriate course of action.

Cane toad (*Bufo marinus*)

Two colonies of cane toads have previously been recorded in Lake Innes Nature Reserve and near Harrington in Manning-Hastings Area. Successful eradication programs in both locations have resulted in no sightings for the past four years. Both sites are regularly monitored for any new incursions. Occasional vagrant individuals are reported throughout the Region and all reports are investigated to ensure correct identification before the animal is destroyed. Many reports come from locations adjacent to transport routes from the northern part of the NSW where cane toad populations are well established.

The cane toad is poisonous at all stages of its life (eggs, tadpoles, toadlets and adult toads) and they impact on native fauna during all of these stages. Their ability to survive in a range of habitats and wide temperature ranges (5–40°C) increases their threat to native species. Insects, smaller toads and native frogs, small snakes and the occasional small mammal are all part of the cane toads' diet. Not only do they prey on native fauna, but they also compete for food, shelter and breeding sites. The invasion and establishment of cane toads has been listed as a KTP under the EPBC Act and TSC Act.

Sightings and new reports from the public are crucial in providing a quick response to new incursions. NPWS staff will seek to confirm the status of any sightings or reports. Control programs involving manual collection and trapping will be implemented if required.

Alligator weed (*Alternanthera philoxeroides*)

Although not present in reserves of the Lower North Coast Region, there is a potential threat to the biodiversity of the Region from alligator weed (*Alternanthera philoxeroides*). Infestations are present off-park near Buladelah and it is common in the landscape to the south of the Region, with scattered infestations throughout Hunter Wetlands National Park.

Alligator weed produces masses of creeping and layering stems over land and water. It is an aggressive invader that responds to high nutrient levels and is a major threat to wetlands, rivers and irrigation systems. New plants regenerate readily from plant fragments which facilitate rapid spread and increase the difficulty of control. Alligator weed is a WoNS. Control techniques include physical removal of plant biomass followed by treatment with metsulfuron-methyl (terrestrial growing plants) and glyphosate (aquatic growing plants).

Appendix 2 Noxious Weeds as at June 2012

As noxious weed listings change refer to the DPI website for up to date listings.[4]

Common name (Scientific name)	Dungog	Gloucester	Great Lakes	Greater Taree	Port Macquarie-Hastings	Port Stephens
African boxthorn (*Lycium ferocissimum*)	4	4	4			4
African feather grass (*Pennisetum macrourum*)	5	5	5	5	5	5
African turnipweed (*Sisymbrium runcinatum*)	5	5	5	5	5	5
African turnipweed (*Sisymbrium thellungii)*	5	5	5	5	5	5
Aleman grass (*Echinochloa polystachya*)		2	2	2	2	
Alligator weed (*Alternanthera philoxeroides*)	2	2	2	2	2	3
Anchored water hyacinth (*Eichhornia azuerea*)	1	1	1	1	1	1
Annual ragweed (*Ambrosia artemisiifolia*)	5	5	5	5	5	5
Arrowhead (*Sagittaria montevidensis*)	4	4	4	4	4	4
Artichoke thistle (*Cynara cardunculus*)	5	5	5	5	5	5
Athel tree (*Tamarix aphylla*)	5	5	5	5	5	5
Bathurst burr *(Xanthium spinosum)*	4	4	4	4	4	4
Bear-skin fescue (*Festuca gautieri*)	5	5	5	5	5	5
Black knapweed (*Centaurea nigra*)	1	1	1	1	1	1
Blackberry (*Rubus* spp.)	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
Bridal creeper *(Asparagus asparagoides)*	4	4	4	4	4	4
Broad-leaf pepper tree (*Schinus terebinthifolius*)		3	3	3	3	
Broomrapes (*Orobanche* spp.)	1	1	1	1	1	1
Burr ragweed (*Ambrosia confertiflora*)	5	5	5	5	5	5
Cabomba (*Cabomba caroliniana*)	5	5	5	5	5	5
Cape broom (*Genista monspessulana*)		2	2	2	2	
Cape tulip (*Homeria* spp.)	4					4
Cayenne snakeweed (*Stachytarpheta cayennensis*)	5	5	5	5	5	5
Chilean needle grass (*Nassella neesiana*)	4	4	4	4	4	4
Chinese celtis (*Celtis sinensis*)		3	3	3	3	
Chinese violet (*Asystasia gangetica* ssp. *micrantha*)	1	1	1	1	1	1
Clockweed (Oenothera *curtiflora*)	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
Crofton weed (*Ageratina adenophora*)		4	4	4	4	4
Dodder (*Cuscuta* spp.)	5	5	5	5	5	5
East Indian hygrophila (*Hygrophila polysperma*)	3	3	3	3	3	3
Espartillo (*Amelichloa brachychaeta*)	5	5	5	5	5	5
Eurasian water milfoil (*Myriophyllum spicatum*)	1	1	1	1	1	1
Fine-bristled burr grass (*Cenchrus brownii*)	5	5	5	5	5	5
Fountain grass (*Pennisetum setaceum*)	5	5	5	5	5	5
Gallon's curse (*Cenchrus biflorus*)	5	5	5	5	5	5
Giant Parramatta grass (*Sporobolus fertilis*)	3	3	4	4	4	3
Giant rat's tail grass (*Sporobolus pyramidalis*)		3	3	3	3	
Glaucous starthistle (*Carthamus glaucus*)	5	5	5	5	5	5
Golden dodder (*Cuscuta campestris*)	4	4	4	4	4	4
Golden thistle (*Scolymus hispanicus*)	5	5	5	5	5	5
Gorse (*Ulex europaeus*)	2					2
Green cestrum (*Cestrum parqui*)	3	3	3	3	3	3
Groundsel bush (*Baccharis halimifolia*)	3	3	3	3	3	3

[4] www.dpi.nsw.gov.au/agriculture/pests-weeds/weeds/profiles

Common name (Botanic name)	Dungog	Gloucester	Great Lakes	Greater Taree	Port Macquarie-Hastings	Port Stephens
Harrisia cacti (*Harrisia* spp.)	4	4	4	4	4	4
Hawkweeds (*Hieracium* spp.)	1	1	1	1	1	1
Heteranthera (*Heteranthera reniformis*)	1	1	1	1	1	1
Horsetail (*Equisetum* spp.)	1	1	1	1	1	1
Hydrocotyle (*Hydroctyle ranunculoides*)	1	1	1	1	1	1
Hygrophila (*Hygrophila costata*)	2	2	2	2	3	2
Hymenachne (*Hymenachne amplexicaulis* & hybrids)	1	1	1	1	1	1
Johnsons grass (*Sorghum halepense*)	4	4	4	4	4	4
Karoo thorn (*Acacia karroo*)	1	1	1	1	1	1
Kochia *(Bassia scoparia*)	1	1	1	1	1	1
Kosters Curse (*Clidemia hirta*)	1	1	1	1	1	1
Lagarosiphon (*Lagarosiphon major*)	1	1	1	1	1	1
Lantana (*Lantana* spp.)	4	4	4	4	4	4
Leafy elodea (*Egeria densa*)	4	4	4	4	4	4
Lippia (*Phyla canescens*)	4	4	4	4	4	4
Long-leaf willow primrose (*Ludwigia longifolia*)	4	4	4	4	4	4
Mexican feather grass (*Nassella tenuissima*)	1	1	1	1	1	1
Mexican poppy (*Argemone mexicana*)	5	5	5	5	5	5
Miconia (*Miconia* spp.)	1	1	1	1	1	1
Mikania (*Mikania micrantha*)	1	1	1	1	1	1
Mimosa (*Mimosa pigra*)	1	1	1	1	1	1
Mistflower (*Ageratina riparia*)						4
Mintweed (*Salvia reflexa*)			4			
Mossman river grass (*Cenchrus echinatus*)	5	5	5	5	5	5
Mother-of-millions (*Bryophyllum delagoense, B.* x *houghtonii*)	3	3	3	3	3	3
Nodding thistle (*Carduus nutans*)	4	4		4	4	
Pampas grass (*Cortaderia* spp.)	4	4	4	4	4	4
Parthenium weed (*Parthenium hysterophorus*)	1	1	1	1	1	1
Patersons curse (*Echium* spp.)	4	4	4	4	4	4
Pond apple (*Annona glabra*)	1	1	1	1	1	1
Prickly acacia (*Acacia nilotica*)	1	1	1	1	1	1
Prickly pear (*Cylindropuntia* spp.)	1	4	4	4	4	4
Prickly pear (*Opuntia* spp.)	4	4	4	4	4	4
Red rice (*Oryza rufipogon*)	5	5	5	5	5	5
Rhus tree (*Toxicodendron succedaneum*)	4	4	4	4	4	4
Rubbervine (*Cryptostegia grandiflora*)	1	1	1	1	1	1
Sagittaria (*Sagittaria platyphylla*)	5	5	5	5	5	5
Salvinia (*Salvinia molesta*)	3	3	3	3	2	3
Scotch broom (*Cytisus scoparius*)	4	4				
Senegal tea plant (*Gymnocoronis spilanthoides*)	1	1	1	1	1	1
Serrated tussock (*Nassella trichotoma*)	4	4	4	4	4	4
Siam weed (*Chromolaena odorata*)	1	1	1	1	1	1
Smooth-stemmed turnip (*Brassica barrelieri* ssp. *oxyrrhina*)	5	5	5	5	5	5
Soldier thistle (*Picnomon acarna*)	5	5	5	5	5	5
Spiny burrgrass (*Cenchrus incertus*)	4	4	4	4	4	4
Spiny burrgrass (*Cenchrus longispinus*)	4	4	4	4	4	4
Spiny emex (*Emex australis*)	4					4
Spotted knapweed (*Centaurea longispinus*)	1	1	1	1	1	1
St Johns wort (*Hypericum perforatum*)	3	3	3	3	3	4
Texas blueweed (*Helianthus ciliaris*)	5	5	5	5	5	5
Tropical Soda Apple (*Solanum viarum*)	2	2	2	2	2	2

Common name (Scientific name)	Dungog	Gloucester	Great Lakes	Greater Taree	Port MacQuarie-Hastings	Port Stephens
Water caltrop (*Trapa* spp.)	1	1	1	1	1	1
Water hyacinth (*Eichhornia crassipes*)	4	3	3	3	2	4
Water lettuce (*Pistia stratiotes*)	1	1	1	1	1	1
Water soldier (*Stratiotes aloides*)	1	1	1	1	1	1
Willows (*Salix* spp. except *S. babylonica*, r*eichardtii*, *calodendron*)	5	5	5	5	5	5
Witchweed (*Striga* spp.)	1	1	1	1	1	1
Yellow burrhead (*Limnocharis flava*)	1	1	1	1	1	1
Yellow nutgrass (*Cyperus esculentus*)	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.

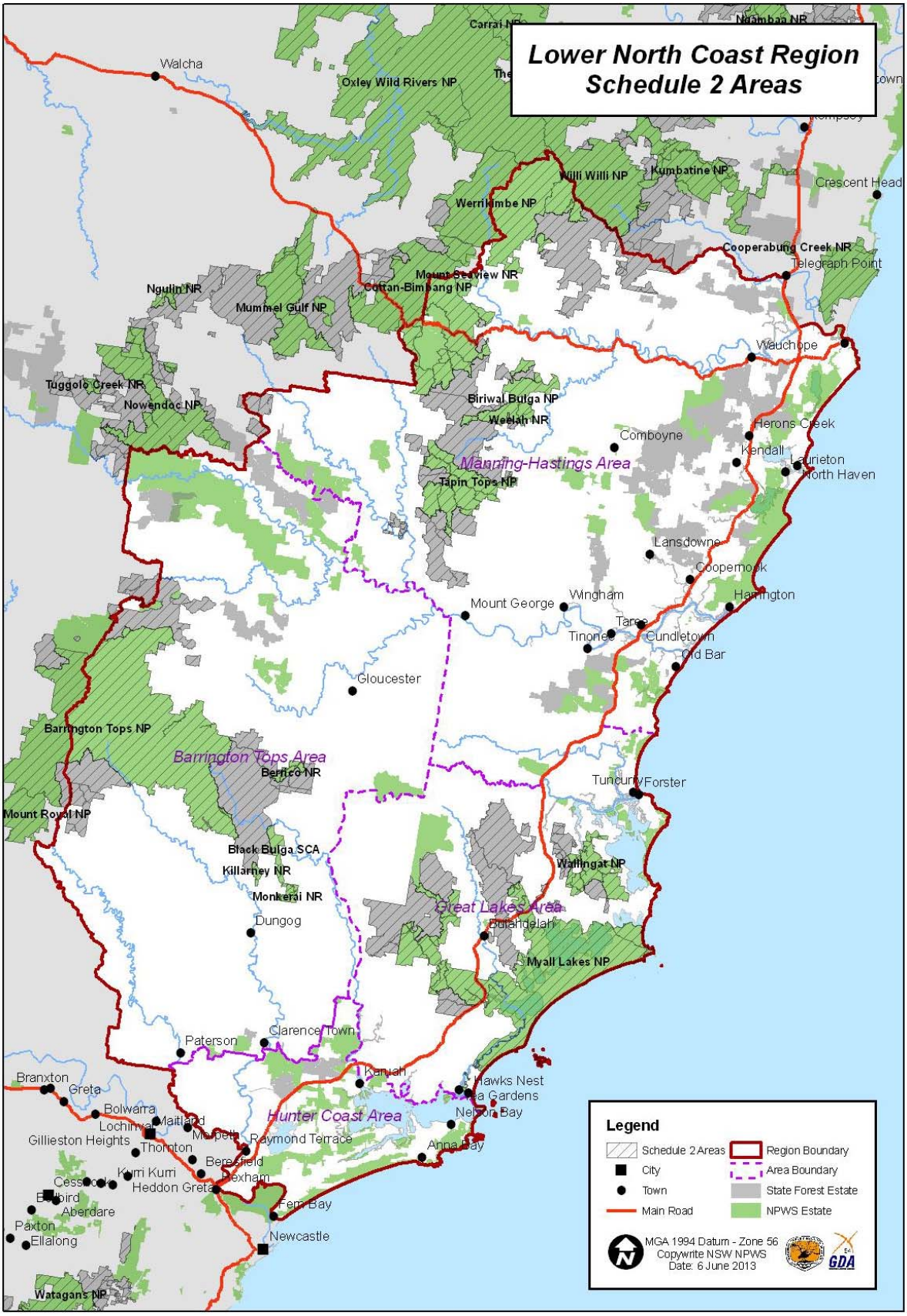
Control Class 3 – Regionally Controlled Weeds – plants that pose a serious threat to primary production or the environment of an area to which the order applies, are not widely distributed in the area and are likely to spread in the area or to another area.

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 3 Schedule 2 lands



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