Office of Environment & Heritage
NSW National Parks & Wildlife Service

North Coast Region

Draft Regional Pest Management Strategy

Part B: 2012-2015

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Contents

Summary

The North Coast Region of the NSW National Parks and Wildlife Service (NPWS) stretches from Crowdy Bay to the Clarence River and west to the Great Dividing Range and includes 118 protected areas, comprising 37 national parks, 57 nature reserves, 15 state conservation areas, three Aboriginal areas, four historic sites and two regional parks.

The reserve system within the North Coast Region protects significant landscapes, including beaches, rocky shores and off shore islands, coastal floodplains and estuaries, forested river gorges and valleys, spectacular sections of the Great Escarpment and plateau woodlands. A diversity of plant and animal communities is present in these reserves, including World Heritage rainforests and old growth eucalypt forest, as well as significant sites of Aboriginal and historic heritage.

The land use patterns of past and present together with the diversity of natural environments in North Coast Region have resulted in a wide and varied range of pest animal and plant species. The main objectives of pest management in parks and reserves is to minimise the impacts of pest species on reserve values and neighbouring landuse and to work cooperatively with other agencies and landholders to achieve these aims. However given the complexity of species, environments and impacts and the limit of resources available, it is critical to view these actions in a strategic context to focus limited resources on the most effective pest management actions.

This Regional Pest Management Strategy identifies the key pest animal and plant species for reserve management in North Coast Region, the values they threaten and the actions that will be taken to minimise impacts. The process for identifying these priority actions has been to review statewide and broad strategic plans for direction, identify key reserve values and threats, consult with key stakeholders and identify what actions can be reasonably undertaken both using agency resources and in partnership with other government authorities, neighbouring landholders and community groups.

The Strategy includes tables of actions for works identified to be undertaken by NPWS during the period covered by this plan. This is a dynamic list which can be reviewed within the principles outlined in the strategy to reflect both successes of some programs and new and emerging threats and issues. This can include the extension of existing pest species such as cane toads or into the Region, or the identification of new threats such as myrtle rust where information on the potential impacts is unclear.

This Strategy profiles the animal pests, weeds and diseases in North Coast Region and outlines the priorities for pest management for the next four years within the Region.

Acronyms

The following acronyms are used throughout this document.

Acronym	Expanded Text
AMS	Asset Maintenance System
BPWW	Biodiversity Priorities for Widespread Weeds
CAP	Catchment Action Plan
CMA	Catchment Management Authority
DECCW	NSW Department of Environment, Climate Change & Water
KPI	Key Performance Indicator
KTP	Key Threatening Process under the TSC Act
MER	Natural Resource Management Monitoring, Evaluation and Reporting
NPW Act	*National Parks and Wildlife Act 1974*
NPWS	NSW National Parks and Wildlife Service
NRM	Natural Resource Management
NSW	New South Wales
OEH	Office of Environment and Heritage
PAS	Priorities Action Statement
PMP	Park Management Program
POM	Plan of Management
PWG	Parks and Wildlife Group, the internal name within OEH for NPWS
PWIS	Pest and Weed Information System
RLP Act	*Rural Lands Protection Act 1998*
ROP	Regional Operations Plan
RPMS	Regional Pest Management Strategy
SOP	Standard Operating Procedure
TAP	Threat Abatement Plan
TSC Act	*Threatened Species Conservation Act 1995*

1. Introduction

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

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

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

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

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

2. Regional overview

The NPWS North Coast Region is located on the Mid North Coast of NSW. It includes the Coffs Harbour City, Bellingen Shire, Nambucca Shire, Kempsey Shire and Port Macquarie Hastings local government areas (LGAs), the majority of the Clarence Valley LGA, and parts of Armidale Dumaresq and Guyra Shire LGAs. It lies within the Northern Rivers Catchment Management Authority.

As at 1 July 2011, the Region was responsible for the management of approximately 492 000 hectares of conservation reserves, comprising 37 national parks (NPs), 57 nature reserves (NRs), 15 state conservation areas (SCAs), three Aboriginal areas (AAs), four historic sites (HSs) and two regional parks (RPs) – a total of 118 protected areas (see map).

These protected areas form parts of the traditional lands of the Yaegl, Gumbaynggirr, Anaiwan, Dunghutti and Birpai nations, whose people retain an active involvement and interest in their management and use.

The reserve system within the North Coast Region protects significant landscapes, ranging from the coast to the New England Tablelands, including beaches, rocky shores and off shore islands, coastal floodplains and estuaries, forested river gorges and valleys, spectacular sections of the Great Escarpment and plateau woodlands. A diversity of plant and animal communities is present in these reserves, including World Heritage rainforests and old growth eucalypt forest, as well as significant sites of Aboriginal and historic heritage. There is an almost continuous chain of wilderness parks along this section of the Great Escarpment, including Werrikimbe, Willi Willi, New England, Cathedral Rock and Guy Fawkes River National Parks, providing part

of the existing protected areas that make up the Great Eastern Ranges Conservation Corridor.

There are long stretches of wild coastlines protected in the reserve system. Yuraygir National Park is the largest coastal park in NSW with over 60 kilometres of coastline featuring rocky headlands and sweeping beaches. When considered in conjunction with the Solitary Islands Marine Park and off shore nature reserves, it is one of the few areas in Australia with a full combination of protected ecological systems from forests, heaths, freshwater streams, swamps, estuaries, coastal lagoons and lakes, beaches, headlands, islands and offshore waters as well as a significant proportion of the catchments of those estuaries.

One of the Region's newest coastal reserves is Gaagal Wanggaan (South Beach) National Park, which is jointly managed by the Aboriginal owners of the land and NPWS under Part 4A of the *National Parks and Wildlife Act 1974*. This protects the coastal lands and Warrell Creek between Nambucca Heads and Scotts Head, an area of special significance to the Gumbaynggirr Aboriginal people.

As well as conserving natural and cultural heritage values in partnership with the community, the Region provides opportunities for sustainable recreation and visitation to parks and reserves, and encourages people to enjoy and appreciate the natural and cultural values they offer. Visitors to the parks and reserves within the Region contribute significantly to the local economy and the Regional Manager sits on the board of the Mid North Coast Regional Tourism Organisation. The Region includes two major visitor centres at Dorrigo National Park (part of the Gondwana Rainforests World Heritage Area) and at Port Macquarie's Sea Acres National Park. These visitor centres are a focus for interpreting the region's unique rainforest areas.

The North Coast Region works in partnership with the community through the National Parks and Wildlife Regional Advisory Committee, which represents local communities with identified interests in heritage conservation, park management, local government and recreation. There is also a community-based Board responsible for the care control and management of the Coffs Coast Regional Park. A Board comprising a majority of Aboriginal owners will soon be appointed with responsibilities for the care, control and management of Gaagal Wanggaan (South Beach) National Park.

The land use patterns of past and present together with the diversity of natural environments have resulted in a wide and varied range of pests. A number of pest species are present in North Coast Region and their impacts can be observed in all reserves (see 7. Pest Distribution Tables).Some of the pests have been present for a long time, for example lantana, introduced to Port Macquarie in 1838, while new introductions such as cane toads at Brooms Head in 2004, and the newly identified pathogen, myrtle rust at a number of locations in the region in 2010 are still emerging as threats. Pest control programs continue to be a high priority within the region. Long standing pest programs such as wild dog control and bitou bush control have reduced the impacts of the targeted species and the region continues to respond to new and emerging threats such as cane toads. The implementation of statewide threat abatement plans for bitou bush and foxes at priority sites over the last five years have led to the recovery of native vegetation and the protection of threatened species. Much of the success of this work is a result of partnerships with other stakeholders such as neighbours, community groups, neighbours, volunteers, agencies and councils.

3. Regional map

4. Regional prioritisation

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

Critical priority

C-TSC (Threatened Species Conservation):

Programs targeting pests which are, or are likely to be, significantly impacting on threatened species/populations/communities. These include the highest priorities identified in the Threat Abatement Plans (TAP), Priority Action Statements (PAS) and BPWW;

C-HD (Health and Disease)

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

C-EC (Economic)

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

C-NE (New and Emerging)

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

High priority

H-IH (International Heritage)

Programs that target pests that impact significantly on World Heritage or international heritage values;

H-CH (Cultural Heritage)

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

Medium priority

M-WNH (Wilderness and National Heritage)

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

M-RA (Recreation and aesthetic values)

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

M-CP (Cooperative programs)

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

Lower priority

L-LP (Localised programs)

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

L-PP (Previous programs)

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

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

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

5. Table of prioritised regional pest programs

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

Area	Reserve(s)	Site name	Target pest or weed	Asset at risk	Aim of control	Action	Priority
Dorrigo Plateau	Bagul Waajaarr Nature Reserve	Bagul Waajaarr Nature Reserve	wild dogs & dingoes	Livestock predation on adjoining properties	Asset protection	Strategic control implemented with neighbours	**C-EC**
Dorrigo Plateau	Bellinger River National Park	Riverine areas	red and fallow feral deer	Riverine communities	Asset Protection	Record sightings, investigate control options	**C-NE**
Dorrigo Plateau	Cascade National Park	Field Study Centre & nearby fire trails	feral cat	Biodiversity	Asset Protection	Monitor & control	**L-LP**
Dorrigo Plateau	Cathedral Rock National Park	Western perimeter trail	wild dogs & dingoes	Livestock predation on adjoining properties, Dingo conservation in Sch 2 area.	Asset Protection	Strategic control implemented with neighbours, canid monitoring	**C-EC**
Dorrigo Plateau	Cathedral Rock National Park	Cathedral Rock National Park	feral pig	EEC	Asset Protection	Trapping and aerial shooting on park and neighbouring lands	**C-EC, C-TSC**
Dorrigo Plateau	Deervale Nature Reserve	Deervale Nature Reserve	wild dogs & dingoes	Livestock predation on adjoining properties	Asset Protection	Reactive 1080 baiting with neighbours	**C-EC**
Dorrigo Plateau	Dorrigo National Park	Dome Rd , Rainforest Centre	feral cat	Biodiversity	Asset Protection	Trapping	**L-LPP**
Dorrigo Plateau	Dorrigo National Park	McGrath Hump	bell miner associated dieback	Native eucalypt forest	Asset Protection	Supporting BMAD ecologist site surveys	**C-TSC**
Dorrigo Plateau	Dorrigo National Park	Dome Rd / Mountain Top	fox	Livestock predation on adjoining properties	Asset Protection	Reactive 1080 baiting with neighbours	**C-EC**

Area	Reserve(s)	Site name	Target pest or weed	Asset at risk	Aim of control	Action	Priority
Dorrigo Plateau	Dorrigo National Park	Gleniffer/ Slingsby Rd	wild dogs & dingoes	Livestock predation on adjoining properties, Dingo conservation in Sch 2 area.	Asset Protection	Reactive 1080 baiting with neighbours	**C-EC**
Dorrigo Plateau	Guy Fawkes River National Park	Wongwibinda Area	wild dogs & dingoes	Livestock predation on adjoining properties, Conserve dingoes in Sch 2 area	Asset protection	Strategic control implemented with neighbours, canid monitoring	**C-EC**
Dorrigo Plateau	Guy Fawkes River National Park	Marengo, Spion Kope	feral deer	Native vegetation, native browsers	Eradication	Record sightings, investigate control options	**C-NE**
Dorrigo Plateau	Guy Fawkes River National Park	Horse Management Zones	feral horses	Macropods, native vegetation, soils, nutrient flows.	Eradication	Trapping, rehoming, survey & monitoring	**M-WNH**
Dorrigo Plateau	Junuy Juluum National Park	Sites TBD	phytophthora	Native vegetation	Asset Protection	Investigate sites and erect educatonal signage	**C-TSC**
Dorrigo Plateau	New England National Park	Sites TBD	bell miner associated dieback	Native eucalypt forest	Asset protection	Supporting BMAD ecologist site surveys	**C-TSC**
Dorrigo Plateau	New England National Park	Upper Darkwood	feral cat	???	Eradication	Trapping, shooting	**L-LP**
Dorrigo Plateau	New England National Park	Upper Darkwood	red and fallow feral deer	Native vegetation, native browsers	Eradication	Record sightings, investigate control options	**C-NE**
Dorrigo Plateau	New England National Park	Upper Darkwood	feral cattle	Native vegetation, native grazers	Eradication	Trapping	**C-NE**
Dorrigo Plateau	New England National Park	North west escarpement	wild dogs & dingoes	Livestock predation on adjoining properties, Conserve dingoes in Sch 2 area	Asset protection	Reactive 1080 baiting with neighbours	**C-EC**
Dorrigo Plateau	New England National Park,	Sites TBD	phytophthora	Native vegetation	Asset Protection	Investigate sites and erect educatonal signage	**C-TSC**
Dorrigo Plateau	Serpentine Nature Reserve / Cunawarra National Park	Parkwide and neighbouring properties	wild dogs & dingoes	Livestock predation on adjoining properties, Conserve dingoes in Sch 2 area	Asset protection	Reactive 1080 baiting with neighbours, map status of barrier fence, canid monitoring	**C-EC**

Area	Reserve(s)	Site name	Target pest or weed	Asset at risk	Aim of control	Action	Priority
Dorrigo Plateau	Bagaal Waajjaarr	Harveys access, track to Silent pool	giant paramatta grass	Grassy woodland	Asset protection	Boom spray	**M-RA**
Dorrigo Plateau	Bagaal Waajjaarr	Haywards Access	giant paramatta grass	Lowland rainforest EEC, dry eucalpt forest, moist eucalypt forest	Asset protection	Boom spray	**M-RA**
Dorrigo Plateau	Bagaal Waajjaarr	Riordans Block	giant paramatta grass	Grassy woodland	Asset protection	Boom spray	**M-RA**
Dorrigo Plateau	Bellinger River National Park	Homelands Lowland Rainforest	madeira vine, balloon vine, trad, privets, mistflower, castor oil	EEC lowland rainforest on floodplain, *Parsonsia dorrigoensis*	Asset protection	Hand pull / dig, backpack spray, cut and paint, frill, scrape and paint	**C-TSC, M-RA**
Dorrigo Plateau	Cascade National Park	Bobo River	groundsel bush	Lowland rainforest EEC	Containment, asset protection	Quickspray	**C-TSC, M-RA**
Dorrigo Plateau	Cascade National Park	Lloyds siding Rd, Briggsvale, Ben Bullen Rd	giant paramatta grass, pine, camphor laurel, privet, groundsel bush	Lowland rainforest EEC	Asset protection	Boom spray, quickspray	**M-RA**
Dorrigo Plateau	Cathedral Rock National Park	Barokee, Cathedral Rock, Round Mountain	oxeye daisy	Sub-alpine woodland, *Gentiana wissmannii*	Asset protection	Quickspray	**C-TSC**
Dorrigo Plateau	Cathedral Rock National Park	Snowy Creek Upland wetland	yorkshire fog grass, blackberry	Montane peatlands and swamps EEC, Upland wetlands of New England Tablelands EEC	Containment, asset protection	Wick wipe, backpack spray	**C-TSC**
Dorrigo Plateau	Chaelundi National Park	Chandlers Cr, upstream from Laytons to Coopers block	lantana, blackberry	Lowland rainforest EEC, dry eucalpt forest, moist eucalypt forest	Asset protection	Quadbike foliar spray	**C-TSC**
Dorrigo Plateau	Chaelundi National Park	Chandlers Creek area	blackberry, lantana, privet	Lowland rainforest EEC, dry eucalpt forest, moist eucalypt forest	Containment, asset protection	Quadbike foliar spray	**C-TSC**
Dorrigo Plateau	Chaelundi National Park	Doon Goonge camping area	giant paramatta grass, blackberry, lantana, privet	Lowland rainforest EEC, dry eucalpt forest, moist eucalypt forest, camp ground	Asset protection	quadbike foliar spray	**M-RA**
Dorrigo	Chaelundi National Park	Doon Goonge Marara Ck	blackberry, lantana	Lowland rainforest EEC, dry eucalpt forest, moist	Asset protection	Quadbike foliar spray	**C-TSC, M-RA**

Area	Reserve(s)	Site name	Target pest or weed	Asset at risk	Aim of control	Action	Priority
Plateau				eucalypt forest			
Dorrigo Plateau	Chaelundi National Park	Johnsons cycad, Frenchmans Creek/ridge	giant paramatta grass, lantana	Dry eucalpt forest, *Macrozamia johnsonii*	Asset protection	quadbike foliar spray	**C-TSC**

Dorrigo Plateau	Chaelundi National Park	Laytons Waterholes	lantana	Lowland rainforest EEC, dry eucalpt forest, moist eucalypt forest	Asset protection	Quadbike foliar spray	**M-RA**
Dorrigo Plateau	Chaelundi National Park	Upper Chandlers Ck	lantana, blackberry	Lowland rainforest EEC, dry eucalpt forest, moist eucalypt forest	Asset protection	Quadbike foliar spray	**M-RA**
Dorrigo Plateau	Cunnawarra National Park	Newells culvert, Armidale-Kempsey Road	pines	Moist eucalypt forest	Containment	Chainsaw, quickspray	**M-RA**
Dorrigo Plateau	Dorrigo National Park	Dorrigo Mountain	madeira vine, balloon vine, moth vine, lantana	EEC lowland rainforest on floodplain, Parsonsia dorrigoensis, Sarcochilus fitzgeraldii	Eradication (madeira vine, balloon vine), containment (moth vine), asset protection	Hand pull / dig out, scrape and paint, foliar spray, splatter gun	**C-TSC, M-RA**
Dorrigo Plateau	Dorrigo National Park	Lower Rosewood Ck	madeira vine, lantana, mistflower, trad	EEC lowland rainforest on floodplain, Gondwana WHA, *Hicksbechia pinnatifolia, Parsonsia dorrigoensis, Anetholea anisata*	Eradication (madeira vine), asset protection	Hand pull / dig out, scrape and paint, foliar spray, splatter gun	**C-TSC, M-RA**
Dorrigo Plateau	Dorrigo National Park	Regen 1 & 2	privets, honeysuckle	Lowland rainforest EEC	Aset protection	Quickspray, hand pull	**C-TSC, M-RA**
Dorrigo Plateau	Dorrigo National Park	Wonga Walk	trad	Lowland rainforest EEC, *Sarcochilus fitzgeraldii, Parsonsia dorrigoensis,* very high profile	Asset protection	Backpack spray, hand pull	**C-TSC**
Dorrigo Plateau	Guy Fawkes River National Park	Ballards Flat	blackberry, coolatai grass, honey locust	River oak gallery forest, dry eucalypt forest	Eradication (honey locust), containment (coolatai grass), asset protection	Quickspray, quadbike foliar spray	**C-NE, M-RA**

Dorrigo Plateau Area	Guy Fawkes River National Park	Bobs creek	blackberry, coolatai grass, honey locust	River oak gallery forest, dry eucalypt forest	Containment, eradication (honey locust), asset protection	Quadbike foliar spray	**C-NE**
Dorrigo Plateau	Guy Fawkes River National Park	Broadmeadows Rd, Liberation Trail, Jordans trail	giant paramatta grass	Grassy woodland	Asset protection	Boom spray	**M-RA**
Dorrigo Plateau	Guy Fawkes River National Park	Chaelundi Road	giant paramatta grass, roadside spraying	Grassy woodland	Asset protection	Boom spray	**M-RA**
Dorrigo Plateau	Guy Fawkes River National Park	Dalmorton precinct incl. camping area	blackberry, lantana, giant paramatta grass	Lowland rainforest EEC, dry eucalpt forest, moist eucalypt forest, camp ground	Asset protection	Quickspray, quadbike foliar spray	**H-CH, M-RA**
Dorrigo Plateau	Guy Fawkes River National Park	Ebor falls	blackberry	Sub-alpine woodland, high scenic values	Containment, asset protection	Quickspray, backpack	**M-RA**
Dorrigo Plateau	Guy Fawkes River National Park	Ebor falls cemetery	blackberry, scotch broom, apples	Sub-alpine woodland, high scenic values	Containment, asset protection	Quickspray, backpack	**M-RA**
Dorrigo Plateau	Guy Fawkes River National Park	Housewater Creek	blackberry, coolatai grass, honey locust	Lowland rainforest EEC, dry eucalpt forest, moist eucalypt forest	Asset protection	Quadbike foliar spray	**C-NE**
Dorrigo Plateau	Guy Fawkes River National Park	Nulluma Trail, Fossickers Ridge, Pine Creek Trail	giant paramatta grass	Grassy woodland	Asset protection	Boom spray	**M-RA**

Dorrigo Plateau	Guy Fawkes River National Park	Perrys to Bobin	blackberry	Lowland rainforest EEC, dry eucalpt forest, moist eucalypt forest	Asset protection	Quadbike foliar spray	**M-WNH, M-RA**
Dorrigo Plateau	Guy Fawkes River National Park	Pine Creek	blackberry, lantana, giant paramatta grass	Lowland rainforest EEC, dry eucalpt forest, moist eucalypt forest	Asset protection	Quickspray, quadbike foliar spray	**M-WNH**
Dorrigo Plateau	Guy Fawkes River National Park	Sara River Starlight gorge to Boyd/Guy Fawkes junc	willows	Lowland rainforest EEC, dry eucalpt forest, moist eucalypt forest	Containment, asset protection	Quadbike foliar spray	**M-WNH**
Dorrigo Plateau	Guy Fawkes River National Park	Wonga block, Marys Cr/Mt Gardiner	blackberry	Grassy woodland	Asset protection	Quadbike foliar spray	**M-WNH**
Dorrigo Plateau	Junuy Juluum National Park	Junuy Juluum entire reserve	privets, honeysuckle, blackberry, giant paramatta grass, black locust	Lowland rainforest EEC, Eucalyptus dorrigoensis, Austrobuxus swainii, Alloxylon pinnatum	Asset protection	Quickspray, bush regen	**M-RA**
Dorrigo Plateau	Mt Hyland	Southern end Marengo flora reserve	blackberry, giant paramatta grass	Sub-alpine woodland, cool temperate rainforest	Asset protection	Quickspray, boom spray	**H-IH**
Dorrigo Plateau	Muldiva Nature Reserve	Muldiva entire reserve	privets, trad	Subtropical rainforest, warm temperate rainforest	Containment, asset protection	Quickspray, backpack, frill	**M-RA**
Dorrigo Plateau	New England National Park	Brinerville / Darkwood	moth vine, cats claw creeper, privets, pyracantha, blackberry, giant paramatta grass, sweet briar, cherry guava, lantana	Lowland rainforest on floodplain EEC, lowland rainforest, Parsonsia dorrigoensis	Eradication (cats claw creeper, cherry guava), restoration, containment, asset protection	Quickspray, splatter gun, frill	**C-TSC**

Dorrigo Plateau	New England National Park	Horseshoe, Kilprotay etc Roads	mistflower	Lowland rainforest EEC, Parsonsia dorrigoensis	Containment, asset protection	Quickspray, hand pull	**M-RA**
Dorrigo Plateau	New England National Park	Misty Valley	blackberry, privet, honeysuckle	Cool temperate rainforest	Aset protection	Quadbike foliar spray	**C-TSC, M-RA**
Dorrigo Plateau	New England National Park	Nulla Nulla Creek and Mathews Ck	mistflower	Lowland rainforest EEC	Containment, asset protection	Backpack spray, hand pull	**M-RA**
Dorrigo Plateau	New England National Park	Petroi	blackberry	Lowland rainforest EEC, dry eucalpt forest, moist eucalypt forest	Asset protection	Quadbike foliar spray	**M-WNH, M-RA**
Dorrigo Plateau	New England National Park	Sunday Creek, Upper Bellinger River	mistflower	Lowland rainforest EEC	Containment, asset protection	Backpack spray, hand pull, biological control	**M-RA**
Dorrigo Plateau	Nymboi-Binderay National Park	Chapmans Plains	pine wildlings	Moist eucalypt forest	Eradication	Chainsaw, quickspray	**C-NE, M-RA**
Dorrigo Plateau	Nymboi-Binderay National Park	Cod Hole camping area	giant paramatta grass, privet, moth vine, trad, smooth senna, honeysuckle, camphor laurel, honey locust, black locust, passionfruit, wild fruit	Lowland rainforest EEC	Asset protection	Quickspray, frill, hand pull	**C-TSC, M-RA**
Dorrigo Plateau	Nymboi-Binderay National Park	Platypus Flat camping area	giant paramatta grass, privet, moth vine, trad, honeysuckle, camphor laurel, honey locust, black locust, passionfruit, wild fruit	Lowland rainforest EEC, camp ground	Asset protection	Quickspray, frill, hand pull	**C-TSC, M-RA**

Dorrigo Plateau	Nymboi-Binderay National Park	Platypus Flat camping area to Blicks crossing	privet, privet, moth vine, trad, smooth senna, honeysuckle, camphor laurel, passionfruit	Lowland rainforest EEC	Asset protection	Quickspray, backpack, frill, hand pull, back pack spray	**C-TSC, M-RA**
Clarence South Area	Yuraygir National Park, Yuraygir State Conservation Area	Northern Yuraygir, Central Yuraygir, Southern Yuraygir	wild dogs	Biodiversity eg Coastal Emu, Public Safety, Neighbours stock	Asset protection	Monitoring, baiting, trapping	C-TSC, C-EC, C-HD, M-CP
Clarence South Area	Other Reserves	Ramornie, Nymboida, Nymboi-Binderay, Chambigne, Sherwood, Byrnes Scrub	wild dogs	Neighbours stock	Asset protection	Reactive program, implemented as required.Monitoring, baiting, trapping	C-EC
Clarence South Area	Yuraygir National Park	Northern Yuraygir, Central Yuraygir, Southern Yuraygir	foxes	Shorebirds, coastal emu, brolga	Asset protection	Ground baiting, trapping, den fumigation	C-TSC
Clarence South Area	Yuraygir National Park	Northern Yuraygir,- Brooms Head-Sandon	cane toads	Biodiversity	Asset protection, containment	Collection, survey, community education/awareness	C-NE, M-CP, L-PP
Clarence South Area	Yuraygir National Park	Northern Yuraygir, Central Yuraygir, Southern Yuraygir	horses	Biodiversity	Asset Protection	passive mustering, adopting out, assist neighbours	M-CP, L-PP
Clarence South Area	Yuraygir National Park	Northern Yuraygir, Central Yuraygir, Southern Yuraygir	pigs	Biodiversity	containment	trapping, opportunistic shooting	L-LP
Clarence South Area	Yuraygir National Park	Wooli	rabbits		eradication,	biocontrol (RHD)	L-LP

Clarence South Area	Yuraygir National Park	Barcoongere River, Yuraygir National Park	Pinus elliotti, Baccharis halimifolia, Lantana camara, exotic grasses	Coastal Saltmarsh EEC (TSC-e), Swamp sclerophyll forest on coastal floodplains EEC (TSC-e), Swamp oak floodplain forest EEC (TSC-e), Swamp sclerophyll forest on coastal floodplains EEC (TSC-e), Swamp oak floodplain forest EEC (TSC-e)	Asset protection, containment	Quickspray, backpack,splatter gun, cut/paint, chainsaw, biocontrol, hand removal	C-TSC, M-CP,L-PP
Clarence South Area	Yuraygir National Park	Sandon River #1, Yuraygir National Park	Baccharis halimifolia, Chrysanthemoides monilifera, Senna pendula var. glabrata, Lantana camara	Sub-tropical Coastal Floodplain Forest EEC (TSC-e), Coastal Saltmarsh EEC (TSC-e), Swamp oak floodplain forest EEC (TSC-e), Swamp sclerophyll forest on coastal floodplains EEC (TSC-e), Littoral Rainforest EEC (EPBC-ce; TSC-e)	Asset protection, containment	Quickspray, backpack,splatter gun, cut/paint, biocontrol, hand removal	C-TSC, M-CP,L-PP
Clarence South Area	Yuraygir National Park	Corindi River, Yuraygir National Park	Baccharis halimifolia, Pinus elliottii, Senna pendula var. glabrata, Lantana camara	Sub-tropical Coastal Floodplain Forest EEC (TSC-e), Coastal Saltmarsh EEC (TSC-e), Swamp oak floodplain forest EEC (TSC-e), Swamp sclerophyll forest on coastal floodplains EEC (TSC-e)	Asset protection, containment	Quickspray, backpack,splatter gun, cut/paint, chainsaw, biocontrol, hand removal	C-TSC, M-CP,L-PP
Clarence South Area	Yuraygir National Park	Mullet Ck - Yuraygir National Park (Green Hills west)	Baccharis halimifolia, Pinus elliottii, Senna pendula var. glabrata, Lantana camara, Setaria sphacelata	Sub-tropical Coastal Floodplain Forest EEC (TSC-e), Coastal Coastal Saltmarsh EEC (TSC-e), Swamp oak floodplain forest EEC (TSC-e), Swamp sclerophyll forest	Asset protection, containment,	Quickspray, backpack,splatter gun, cut/paint, chainsaw, biocontrol, hand removal	C-TSC, M-CP,L-PP

				on coastal floodplains EEC (TSC-e)			
Clarence South Area	Yuraygir National Park	Saltwater Ck Yuraygir National Park	Baccharis halimifolia, Pinus elliotti, Lantana camara, Senna pendula var. glabrata,	Sub-tropical Coastal Floodplain Forest EEC (TSC-e), Coastal Saltmarsh EEC (TSC-e), Swamp oak floodplain forest EEC (TSC-e), Swamp sclerophyll forest on coastal floodplains EEC (TSC-e)	Asset protection, containment	Quickspray, backpack,splatter gun, cut/paint, chainsaw, biocontrol, hand removal	C-TSC, M-CP,L-PP
Clarence South Area	Yuraygir National Park	Station Creek Yuraygir National Park	Baccharis halimifolia, Pinus elliotti, Lantana camara, Senna pendula var. glabrata, Asparagus aethiopicus, Paspalum mandiocanum, Lilium formosanum	Sub-tropical Coastal Floodplain Forest EEC (TSC-e), Coastal Saltmarsh EEC (TSC-e), Swamp oak floodplain forest EEC (TSC-e), Swamp sclerophyll forest on coastal floodplains EEC (TSC-e)	Asset protection, containment	Quickspray, backpack,splatter gun, cut/paint, chainsaw, biocontrol, hand removal	C-TSC, C - NE (Broad leafed paspalum, Formosa Lily)M-CP,L-PP
Clarence South Area	Yuraygir National Park	Wooli River, Yuraygir National Park	Baccharis halimifolia, Pinus elliotti, Lantana camara	Sub-tropical Coastal Floodplain Forest EEC (TSC-e), Coastal Saltmarsh EEC (TSC-e), Swamp oak floodplain forest EEC (TSC-e), Swamp sclerophyll forest on coastal floodplains EEC (TSC-e)	Asset protection, containment	Quickspray, backpack,splatter gun, cut/paint, chainsaw, biocontrol	C-TSC, M-CP,L-PP
Clarence South Area	Yuraygir National Park	Toumbaal Ck, Yuraygir National Park	Baccharis halimifolia, Chrysanthemoides monilifera, Senna pendula var. glabrata, Lantana camara	Sub-tropical Coastal Floodplain Forest EEC (TSC-e), Coastal Saltmarsh EEC (TSC-e), Swamp oak floodplain forest EEC (TSC-e), Swamp sclerophyll forest on coastal floodplains EEC (TSC-e)	Asset protection, containment	Quickspray, backpack,splatter gun, cut/paint, chainsaw, biocontrol, hand removal	C-TSC, M-CP,L-PP

Clarence South Area	Yuraygir National Park	Sandon backtrack, Sandon bluffs & Sandon south	Chrysanthemoides monilifera subsp. rotundata, Lantana camara, Senna pendula, Gloriosa superba, Ipomoea cairica, Ochna serrulata	Littoral Rainforest EEC (EPBC-ce; TSC-e), Acianthus exiguous [ROTAP 3RC, Bitou - High], Sophora tomentosa (TSC-e) Chamaesyce psammogeton (TSC-e), Calystegia soldanella Bitou TAP high, Stackhousia spathulata [Bitou TAP - High], Vigna marina [Bitou TAP - High], Gleichenia mendellii [Bitou TAP - High], Acrostichum speciosum, Marsdenia liisae [ROTAP] [Bitou TAP - Low], Themeda grassland on headlands EEC (EPBC-ce; TSC-e), Swamp sclerophyll forest on coastal floodplains EEC (TSC-e), coastal Banksia forest,	Asset protection, containment	Quickspray, backpack,splatter gun, cut/paint, , biocontrol, hand removal	C-TSC, M-CP M-RA ,L-PP
Clarence South Area	Yuraygir National Park	Lake Cakora catchment - Yuraygir National Park	Baccharis halimifolia, Chrysanthemoides monilifera, Senna pendula var. glabrata, Paspalum urvillei, Lantana camara	Coastal Coastal Saltmarsh EEC (TSC-e), Swamp sclerophyll forest on coastal floodplains EEC (TSC-e), Swamp oak floodplain forest EEC (TSC-e), Rutidosis heterogama (EPBC-v; TSC-v)	Asset protection, containment	Quickspray, backpack,splatter gun, cut/paint, , biocontrol, hand removal	C-TSC, M-CP ,L-PP
Clarence South Area	Yuraygir National Park	Candole Ck Yuraygir National Park	Baccharis halimifolia, Chrysanthemoides monilifera, Senna pendula var. glabrata, Lantana camara	Sub-tropical Coastal Floodplain Forest EEC (TSC-e), Coastal Saltmarsh EEC (TSC-e), Swamp sclerophyll forest on coastal floodplains EEC (TSC-e)	Asset protection, containment	Quickspray, backpack,splatter gun, cut/paint, , biocontrol, hand removal	C-TSC, M-CP ,L-PP

Clarence South Area	Yuraygir National Park	Big Island, Red Rock - Yuraygir National Park	Senna pendula var. glabrata, Asparagus aethiopicus, Ipomoea cairica, Lantana camara, Euphorbia cyathophora, Baccharis halimifolia, Chrysanthemoides monilifera	Coastal Saltmarsh EEC (TSC-e), Swamp sclerophyll forest on coastal floodplains EEC (TSC-e), Swamp oak floodplain forest EEC (TSC-e) Pied Oystercatcher (TSC-e), Beach stone curlew	Asset protection, containment	Quickspray, backpack,splatter gun, cut/paint, , biocontrol, hand removal	C-TSC, M-CP ,L-PP
Clarence South Area	Yuraygir National Park	Pebbly Beach Yuraygir National Park	Ochna serrulata, Paspalum mandiocanum, Senna pendula var. glabrata, Pinus elliotti, Cinnamomum camphora, Chrysanthemoides monilifera, Lantana camara, Ipomoea cairica	Littoral Rainforest EEC (EPBC-ce; TSC-e), TThemeda Grassland on seacliffs and coastal headlands EEC (TSC-e), TThemeda Grassland on seacliffs and coastal headlands EEC (TSC-e), Casuarina equisetifolia [Bitou TAP - Medium], Calystegia soldanella (Bitou Tap high)	Asset protection, containment	Quickspray, backpack,splatter gun, cut/paint, , biocontrol, hand removal	C-TSC, C - NE (Broad leafed paspalum) M-CP, M-RA ,L-PP
Clarence South Area	Yuraygir National Park	Shelley Headland Yuraygir National Park	Chrysanthemoides monilifera subsp. rotundata, Lantana camara, Senna pendula, Ipomoea cairica, Ochna serrulata	Pultenaea maritima (TSC-v), Themeda Grassland on seacliffs and coastal headlands EEC (TSC-e), Coastal Banksia woodlands, Littoral Rainforest EEC (EPBC-ce; TSC-e)	Asset protection,	Aerial spray, quadbike,backpack, hand removal, biocontrol.	C-TSC
Clarence South Area	Susan Island Nature Reserve	Susan Island Nature Reserve	Acetosa sagittata, Araujia sericifera, Aristolochia elegans, Cardiospermum grandiflorum, Cinnamomum camphora, Erythrina crista-galli, Ipomoea alba, Ipomoea cairica, Lantana camara, Ligustrum lucidum, Ligustrum sinense,	Lowland Rainforest on Floodplain EEC (TSC-e)	Asset protection, containment, erdaication	Backpack, cut/scrape/paint, hand removal, tree injection	C-TSC, M-CP, ,L-PP

			Macfadyena unguis-cati, Ricinis communis, Tradescantia fluminensis, Syagrus romanzoffiana, Acetosa sagittata, Schlefflera actinophylla, Rivinia humilis				
Clarence South Area	Yuraygir National Park	Jones Beach Yuraygir National Park	Lantana camara, Senna pendula var. glabrata, Chrysanthemoides monilifera subsp. rotundata, Ageratina adenophora	Phauis australis (EPBC-e; TSC-e), Swamp sclerophyll forest on coastal floodplains EEC (TSC-e)	Asset protection, containment	Quickspray, backpack,splatter gun, cut/paint, , biocontrol, hand removal	C-TSC
Clarence South Area	Yuraygir National Park	Sandon River #2, Yuraygir National Park	Lantana camara, Senna pendula var. glabrata, Chrysanthemoides monilifera subsp. rotundata, Stenotaphrum secundatum, Gloriosa superba	Sophora tomentosa (TSC-e), Swamp oak floodplain forest EEC (TSC-e)	Asset protection, containment	Quickspray, backpack,splatter gun, cut/paint, , biocontrol, hand removal	C-TSC, L-PP
Clarence South Area	Yuraygir National Park	Redcliff Bitou TAP site - Yuraygir National Park	Ochna serrulata, Paspalum mandiocanum, Senna pendula var. glabrata, Pinus elliotti, Chrysanthemoides monilifera, Lantana camara, Ipomoea cairica	Themeda Grassland on seacliffs and coastal headlands EEC (TSC-e), Littoral Rainforest EEC (EPBC-ce; TSC-e), Sophora tomentosa (TSC-e), Pultenaea maritima (TSC-v) (TSC-v; Bitou TAP - High), Thesium australe (EPBC-v; TSC-v)	Asset protection, containment	Quickspray, backpack, cut/paint, , biocontrol, hand removal	C-TSC, M-CP, ,L-PP
Clarence South Area	Yuraygir National Park	Pigeon Gully, Yuraygir National Park	Lantana camara, Senna floribunda, Passiflora subpeltata	Lowland Rainforest EEC (TSC-e), Acronychia littoralis (EPBC-e;TSC-e), Boronia hapalophylla (TSC-e), Giant Barred Frog (EPBC-e; TSC-e)	Asset protection,	Splatter gun, hand removal	C-TSC
Clarence South Area	Yuraygir National Park	North Sandon, Yuraygir National Park	Lantana camara, Senna pendula var. glabrata, Chrysanthemoides	Sophora tomentosa (TSC-e), Littoral Rainforest EEC (EPBC-ce; TSC-e), Littoral	Asset protection, containment	Quickspray, backpack,splatter gun, cut/paint, , biocontrol, hand	C-TSC, M-CP, ,L-PP

			monilifera subsp. rotundata, Stenotaphrum secundatum, Gloriosa superba, Ipomoea cairica, Passiflora subpeltata, Leptospermum laevigatum, Acacia saligna	Rainforest EEC (EPBC-ce; TSC-e), Acianthus exiguous [ROTAP 3RC, Bitou - High], Stackhousia spathulata [Bitou TAP - High], Acianthus amplexicaulis [Bitou TAP - Low]		removal	
Clarence South Area	Yuraygir National Park	Freshwater-Jones Beach,	Lantana camara, Senna pendula var. glabrata, Chrysanthemoides monilifera subsp. rotundata, , Ipomoea cairica, Passiflora subpeltata,	Themeda Grassland on seacliffs and coastal headlands EEC (TSC-e), Littoral Rainforest EEC, Chamaesyce psammogeton (TSC-e), Calystegia soldanella (Bitou Tap high), Ischaeum triticeum (Bitou TAP high), Dianella congesta (Bitou TAP-medium)	Asset protection, containment	Quickspray, aerial spray backpack,splatter gun, cut/paint, , biocontrol, hand removal	C-TSC, window of opportunity
Clarence South Area	Yuraygir National Park	Wilsons Headland-Bare Pt-Diggers Camp Yuraygir National Park	Lantana camara, Senna pendula var. glabrata, Chrysanthemoides monilifera subsp. rotundata, Gloriosa superba, Ipomoea cairica, Passiflora subpeltata, Pennisetum clandestinum, Paspalum urvillei, Hyparrhenia hirta, Andropogon virginicus, Lilium formosanum	Plectranthus cremnus [ROTAP 3K, Bitou TAP - High], Chamaecrista maritima [Bitou TAP - High], Ischaemum triticeum [Bitou TAP - High], Pultenaea maritima (TSC-v), Thesium australe (EPBC-v; TSC-v), Themeda Grassland on seacliffs and coastal headlands EEC (TSC-e)	Asset protection, containment, eradication (Singapore Daisy, Formosa Lily),	Quickspray, aerial spray backpack,splatter gun, cut/paint, , biocontrol, hand removal	C-TSC, M-RA, M-CP, C-NE(Coolatai Grass)
Clarence South Area	Yuraygir National Park	Lake Arragan to Shelley Headland, including Plumbago Headland, Yuraygir National	Lantana camara, Senna pendula var. glabrata, Chrysanthemoides monilifera subsp. rotundata, Ipomoea cairica,, Leptospermum laevigatum, Acacia	Themeda Grassland on seacliffs and coastal headlands EEC (TSC-e)	Asset protection, containment	Quickspray, aerial spray backpack,splatter gun, cut/paint, , biocontrol, hand removal	C-TSC, L-PP

		Park	saligna, Euphorbia cyathophora, Cenchrus echinatus, Baccharis halimifolia				
Clarence South Area	Yuraygir National Park	Cratchleys, Yuraygir National Park	Lantana camara, Senna pendula var. glabrata, Chrysanthemoides monilifera subsp. rotundata, Gloriosa superba, Ipomoea cairica, Passiflora subpeltata, Lilium formosanum, Ochna serrulata	Swamp sclerophyll forest on coastal floodplains EEC (TSC-e), littoral rainforest EEC	Asset protection, containment	Quickspray, backpack,splatter gun, cut/paint, , biocontrol, hand removal	H-CH, M-RA, M-CP
Clarence South Area	Yuraygir National Park	Station Creek Beach Yuraygir National Park	Baccharis halimifolia, Chrysanthemoides monilifera subsp. rotundata, Pinus elliotti, Lantana camara, Senna pendula var. glabrata, Asparagus aethiopicus, Paspalum mandiocanum, Lilium formosanum	Actites megalocarpa [Bitou TAP - High], Geodorum densiflorum (TSC-e)	Asset protection, containment	Quickspray, backpack,, cut/paint, , biocontrol, hand removal	C-TSC
Clarence South Area	Yuraygir National Park	Lake Arragan, Yuraygir National Park	Baccharis halimifolia, Lantana camara, Senna pendula var. glabrata, Chrysanthemoides monilifera subsp. rotundata, Ipomoea cairica,, Leptospermum laevigatum, Acacia saligna,	Coastal Saltmarsh EEC (TSC-e), Swamp sclerophyll forest on coastal floodplains EEC (TSC-e), Swamp oak floodplain forest EEC (TSC-e)	Asset protection, containment	backpack, biocontrolcut/scrape/paint, hand removal, chaninsaw	C-TSC
Clarence South Area	Nymboida National Park	The Junction camping area	Ligustrum lucidum, Ligustrum sinense, Lantana camara	The Junction Camping area, riparian vegetation	Asset protection,	Cut and paint, back pack spray, hand pull	M-RA, L-PP
Clarence South Area	Yuraygir National Park	Rocky Pt, Yuraygir National Park	Chrysanthemoides monilifera subsp. rotundata, Lantana camara, Senna pendula, Ipomoea cairica, Ochna	Pultenaea maritima (TSC-v), Vigna marina [Bitou TAP - High], Gleichenia mendellii [Bitou TAP - High]	Asset protection, containment	Quickspray, backpack, cut and paint hand removal	C-TSC

			serrulata				
Clarence South Area	Nymboi-Binderay National Park	Nymboida River Camping Area	Ligustrum lucidum, Ligustrum sinense, Lantana camara	Nymboida River Camping Area, riparian vegetation	Asset protection,	Cut and paint, back pack spray, hand pull	M-RA, L-PP
Clarence South Area	Yuraygir National Park	Plover Island, Yuraygir National Park	Chrysanthemoides monilifera subsp. rotundata, Lantana camara, Senna pendula, Ipomoea cairica,	Viminaria juncea - prostrate form [Bitou TAP - Medium],	Asset protection, eradication	Quikspray, backpack spray, cut paint, hand pull	L-PP, L-LP
Clarence South Area	Yuraygir National Park	Illaroo Rest Area	Chrysanthemoides monilifera subsp. rotundata, Lantana camara, Senna pendula, Ipomoea cairica,	Illaroo Rest Area	Asset protection,	Quikspray, backpack spray, cut paint, hand pull	M-RA
Clarence South Area	Yuraygir National Park	Station Ck Rest Area	Chrysanthemoides monilifera subsp. rotundata, Lantana camara, Senna pendula, Ipomoea cairica, Paspalum mandiocanum	Station Ck Rest Area	Asset protection,	Quikspray, backpack spray, cut paint, hand pull	M-RA
Clarence South Area	Yuraygir National Park	Back Beach Minnie Waters	Chrysanthemoides monilifera subsp. rotundata, Lantana camara, Senna pendula, Ipomoea cairica, Gloriosa superba	Stackhousia spathulata (Bitou TAP - High)	Asset protection, containment	Quikspray, backpack spray, cut paint, hand pull	L-PP, L-LP
Clarence South	Yuraygir National Park	All camping and day use areas	Soliva sessilis		Asset protection	Quikspray, backpack spray	M-RA
Coffs Coast	Bongil Bongil National Park	Northern sand spit and buffer area	fox	Little Terns	Asset Protection	1080 baiting, trapping, signposting, survey & monitor	C-TSC
Coffs Coast	Bongil Bongil National Park	Predator barrier fencing	domestic dogs, bandicoots, possums	Little Terns	Asset Protection	Barrier fencing	C-TSC
Coffs Coast	Bongil Bongil National Park	Northern sand spit and buffer area	corvid species	Little Terns	Asset Protection	Poisoning	C-TSC

Coffs Coast	Bongil Bongil National Park	Western BBNational Park	wild dog & dingoes	Livestock predation on adjoining private land, conserve dingoes on Sch 2 area	Prevention, Asset Protection	Reactive 1080 baiting with neighbours, survey & monitor	C-EC
Coffs Coast	Coffs Coast Regional Park	Hearnes lake	fox	Little Terns	Asset Protection	1080 baiting, trapping, barrier fencing and monitoring	C-TSC
Coffs Coast	Muttonbird Island Nature Reserve	Reserve wide	black rat, house mouse	Shearwaters (muttonbirds)	Asset Protection	Poison baiting, trapping, survey & monitor	H-IH
Coffs Coast	Muttonbird Island Nature Reserve	Jetty Foreshore and eastern edge of reserve	fox	Shearwaters (muttonbirds)	Asset Protection	den fumigation, 1080 baiting	H-IH
Coffs Coast	South Solitary Island	Reserve wide	house mouse	Shearwaters (muttonbirds)	Asset Protection	1st generation rodenticide batiting	H-IH
Coffs Coast	All Reserves	Various	cane toad	Biodiversity	Eradication	Respond to reports, hand collection, night survey & monitor	C-NE
Coffs Coast	Bongil Bongil National Park	BBNational Park East	feral cats	Biodiversity	Eradication	Trapping	L-PP
Coffs Coast	Gaagal Wanggaan National Park	FoxTAP site & buffer area	fox	Little Terns	Asset Protection	1080 baiting, trapping, fencing, signposting,survey & monitor	C-TSC
Coffs Coast	Jaaningga Nature Reserve	Parkwide	wild dog & dingo	Livestock predation on adjoining land	Asset Protection	Strategic 1080 baiting with neighbours, survey & monitor	C-EC
Coffs Coast	Ngambaa Nature Reserve	Parkwide	wild dog & dingo	Livestock predation on adjoining private land, conserve dingoes on Sch 2 area	Asset Protection	Reactive 1080 baiting with neighbours, survey & monitor	C-EC
Coffs Coast	Yarriabinni National Park	Parkwide	wild dog & dingo	Livestock predation on adjoining land	Asset Protection	Reactive 1080 baiting with neighbours, trapping, survey & monitor	C-EC
Coffs Coast	Dunggir National Park	Parkwide	wild dog & dingo	Livestock predation on adjoining private land, conserve dingoes on Sch 2 area	Asset Protection	Reactive 1080 baiting with neighbours, survey & monitor	C-EC
Coffs Coast	Dunggir National Park,	Rufous scrub bird habitat	various	Rufous scrub bird	Asset Protection	Survey and monitor	C-TSC

	Gumbaingirr State Conservation Area						
Coffs Coast	Bindarri National Park	Bindarri Roads	pasture grasses, blue billy goat, crofton	Lowland rainforest EEC, moist eucalypt forest, *Parsonsia dorrigoensis*	Asset protection	Quickspray	M-RA
Coffs Coast	Bindarri National Park	Granite Pit Road	lantana, privets, broadleaf paspalum, morning glory	Lowland rainforest EEC, moist eucalypt forest, *Anetholea anisata, Amorphospermum whitei*	Containment, asset protection	Splatter gun, quickspray, cut and paint, hand removal	C-TSC, M-RA
Coffs Coast	Bindarri National Park	Lower Urumbullum Bindaray picnic areas	lantana,exotic grasses, crofton weed	Lowland rainforest EEC, *Parsonsia dorrigoensis, Amorphospermum whitei, Alloxylon pinnatum, Austrobuxus swainii*	Asset protection	Backpack spraying, cut and paint, hand pull	C-TSC, M-RA
Coffs Coast	Bindarri National Park	Urumbullum Dairyville entrance	lantana, broadleaf paspalum	Lowland rainforest EEC, *Parsonsia dorrigoensis, Amorphospermum whitei*	Asset protection	Backpack spraying, cut and paint, hand pull	C-TSC, M-RA
Coffs Coast	Bongil Bongil National Park	Baileys, Burkes, Godfreys, Raceway Rds	broadleaf paspalum, lantana	Lowland rainforest EEC, moist eucalypt forest, *Parsonsia dorrigoensis*	Asset protection	Quickspray	M-RA
Coffs Coast	Bongil Bongil National Park	Bluff Loop Walk	winter senna, lantana, broadleaf paspalum	Littoral rainforest EEC, swamp sclerophyll forest EEC, moist eucalypt forest, *Acianthus exiguus*	Asset protection	Backpack spraying, Quadbike spraying, splatter gun, handpull	C-TSC, M-RA
Coffs Coast	Bongil Bongil National Park	Bongil Picnic Area	broadleaf paspalum, lantana, canna lily, camphor, winter senna	Littoral rainforest EEC, moist eucalypt forest	Asset protection	Backpack spraying, hand pull	M-RA
Coffs Coast	Bongil Bongil National Park	Bonville Creek research site	broadleaf paspalum, lantana	Lowland rainforest EEC, moist eucalypt forest	Asset protection	Backpack spraying, cut and paint, hand pull	C-TSC, M-RA
Coffs Coast	Bongil Bongil National Park	Bundagaree Trail	broadleaf paspalum, giant parramatta grass, molasses grass	Littoral rainforest EEC, moist eucalypt forest	Asset protection	Quadbike spraying	C-TSC, M-RA
Coffs Coast	Bongil Bongil National Park	Burma Frisbys Roads	lantana, broadleaf paspalum, winter senna, wandering jew	Swamp oak forest EEC, moist eucalypt forest, *Amorphospermum whitei, Alexfloydia repens*	Asset protection	Backpack spraying, cut and paint, hand pull	C-TSC, M-RA

Coffs Coast	Bongil Bongil National Park	Burma, Frisby, Saund, Overhead Bridge and Holts Rds and Spring Track	broad leaf paspalum	Moist eucalypt forest	Asset protection	Quickspray	M-RA
Coffs Coast	Bongil Bongil National Park	Cabans, Tower, Lux, Hains, Rey, Full, Seav, Halls, Cpt trails	broad leaf paspalum	Moist eucalypt forest	Asset protection	Quickspray	M-RA
Coffs Coast	Bongil Bongil National Park	Clarkes Road rainforest	lantana, morning glory, broadleaf paspalum	Lowland rainforest EEC, *Parsonsia dorrigoensis, Amorphospermum whitei*	Asset protection	Backpack spraying, cut and paint, hand pull	C-TSC
Coffs Coast	Bongil Bongil National Park	East Ren, Beach, Palm Cross, Souris, School Rds	broad leaf paspalum, lantana	Moist eucalypt forest	Asset protection	Quickspray	M-RA
Coffs Coast	Bongil Bongil National Park	Flying Fox trail	broad leaf paspalum, lantana	Moist eucalypt forest	Asset protection	Quickspray, splatter gun	M-RA
Coffs Coast	Bongil Bongil National Park	Glory lily contractors	glory lily	Littoral rainforest EEC	Asset protection	Backpack spraying	C-TSC
Coffs Coast	Bongil Bongil National Park	Gordons, Red Hill, Toby Rds	broad leaf paspalum, lantana	Moist eucalypt forest	Asset protection	Quickspray	M-RA
Coffs Coast	Bongil Bongil National Park	Groundsel trail	lantana	Moist eucalypt forest	Asset protection	Splatter gun	M-RA
Coffs Coast	Bongil Bongil National Park	Hunters, Cabbage Tree, Thome Ridge and Flying fox Rds	broad leaf paspalum, lantana	Moist eucalypt forest	Asset protection	Quickspray	M-RA
Coffs Coast	Bongil Bongil National Park	Kite Creek	broadleaf paspalum, lantana, winter senna, groundsel bush	Alexfloydia repens, Amorphospermum whitei, Tylophora woollsii	Asset protection	Backpack spraying, hand pull	C-TSC
Coffs Coast	Bongil Bongil National Park	Lyons, Railway, Williams Rds and trails nw of Williams Rd	broadleaf paspalum, lantana	Moist eucalypt forest, Lowland rainforest EEC	Asset protection	Quickspray	M-RA
Coffs Coast	Bongil Bongil National Park	North Beach Bundagen	glory lily	Littoral rainforest EEC, coastal woodland	Asset protection	Backpack spraying	C-TSC

Coffs Coast	Bongil Bongil National Park	North Scrub Creek	glory lily	Littoral rainforest EEC, coastal woodland, Acronychia littoralis, Chamaesyce psammogeton	Asset protection	Backpack spraying	C-TSC
Coffs Coast	Bongil Bongil National Park	Old Coast Road	lantana	Moist eucalypt forest, Lowland rainforest EEC	Asset protection	Splatter gun	M-RA
Coffs Coast	Bongil Bongil National Park	Overhead Bridge Rd 'Delayed transfer' (site 15)	lantana, broadleaf paspalum, winter senna	Moist eucalypt forest, Lowland rainforest EEC, adjacent to RTA fauna overpass	Asset protection	Splatter gun, quickspray, cut and paint, hand removal	C-TSC
Coffs Coast	Bongil Bongil National Park	Palm Crossing Trail	rhodes grass	Lowland rainforest EEC, moist eucalypt forest, *Acronychia littoralis, Chamaesyce psammogeton*	Asset protection	Quickspray	M-RA
Coffs Coast	Bongil Bongil National Park	Peninsula Pine Block	broad leaf paspalum, lantana	Moist eucalypt forest, Littoral rainforest EEC	Asset protection	Splatter gun, cut and paint, backpack spraying, hand pull	C-TSC
Coffs Coast	Bongil Bongil National Park	Pine Creek east	broad leaf paspalum, lantana	Moist eucalypt forest, swamp oak forest EEC, *Alexfloydia repens*	Asset protection	Backpack spraying, hand pull	C-TSC
Coffs Coast	Bongil Bongil National Park	Pine Creek west	broad leaf paspalum, lantana	Moist eucalypt forest, swamp oak forest EEC, Alexfloydia repens	Asset protection	Backpack spraying, hand pull	C-TSC
Coffs Coast	Bongil Bongil National Park	Plantation blocks	lantana, winter senna, gympie messmate	Moist eucalypt forest, Littoral rainforest EEC	Asset protection	Splatter gun, cut and paint, backpack spraying spray, hand removal	C-TSC
Coffs Coast	Bongil Bongil National Park	Raceway trail	broadleaf paspalum, lantana	Moist eucalypt forest	Asset protection	Quickspray, splatter gun	M-RA
Coffs Coast	Bongil Bongil National Park	Reedys, Archers, Balls Rds	broadleaf paspalum, lantana	Moist eucalypt forest, Lowland rainforest EEC	Asset protection	Quickspray	M-RA
Coffs Coast	Bongil Bongil National Park	Sand hills	lantana, bitou bush, broadleaf paspalum, winter senna	Moist eucalypt forest, Littoral rainforest EEC	Asset protection	Backpack spraying, hand pull	C-TSC
Coffs Coast	Bongil Bongil National Park	Scrub Creek	lantana, bitou bush	Swamp sclerophyll forest EEC, Littoral rainforest EEC, *Acronychia littoralis,*	Asset protection	Backpack spraying, hand pull	C-TSC, M-RA

				*Chamaesyce psammogeto*n			
Coffs Coast	Bongil Bongil National Park	Scrubby Rd, Clarkes, Duffs, OCon, Caper, Tuckers, Ground, Myle Rds	broadleaf paspalum, lantana	Moist eucalypt forest, Littoral rainforest EEC	Asset protection	Quickspray	M-RA
Coffs Coast	Bongil Bongil National Park	Williams Road	broadleaf paspalum, lantana, crofton weed, narrow leaf cotton bush, blue billy goat weed, thistles	Moist eucalypt forest, Littoral rainforest EEC	Asset protection	Mattock, hand pull, quickspray, backpack spraying	M-RA
Coffs Coast	Coramba Nature Reserve	Coramba rainforest	wandering jew	Lowland rainforest on floodplain EEC, *Senna acclinis*	Asset protection	Hand pull, backpack spraying	C-TSC
Coffs Coast	Coramba Nature Reserve	Crowes	privets, wandering jew, moth vine	Lowland rainforest on floodplain EEC	asset protection	Hand pull, frilling, cut paint, backpack spraying	C-TSC
Coffs Coast	Coramba Nature Reserve	Wattle plant out	privets, wandering jew, moth vine	Lowland rainforest on floodplain EEC	asset protection	Frilling, cut paint, backpack spraying	C-TSC
Coffs Coast	Garby Nature Reserve	APZ	blue billy goat, grasses, annual weeds	Graminoid heath, coastal woodland	Asset protection	Quickspray	C-EC
Coffs Coast	Garby Nature Reserve	Arrawarra Rd grasses	paspalum, whiskey gass, kikuyu	Graminoid heath EEC, coastal woodland	Asset protection	Quickspray	C-TSC
Coast Coffs	Garby Nature Reserve	Gunbarrel Western boundary	setaria, giant parramatta grass, whiskey grass, rhodes grass	Graminoid heath EEC, coastal woodland	Asset protection	Quadbike spraying or backpack spraying	C-TSC
Coffs Coast	Garby Nature Reserve	PFU1	post-fire grasses - setaria, giant parramatta grass, whiskey grass, rhodes grass	Graminoid heath EEC, coastal woodland	Asset protection	Backpack spraying	C-TSC
Coffs Coast	Garby Nature Reserve	School	lantana, grasses, blue billy goat weed, crofton weed	Moist eucalypt forest	Asset protection	Quickspray, cut stump	M-RA
Coffs Coast	Garby Nature Reserve	Wet areas	groundsel bush	Graminoid heath EEC, swamp sclerophyll forest	Containment, asset protection	Backpack spraying	C-TSC
Coffs Coast	Kororo Nature Reserve	Kororo	lantana, ochna, crofton weed	Moist eucalypt forest, Lowland rainforest EEC, *Kennedia retrorsa*	Asset protection	Backpack spraying, splatter, cut paint	M-RA

Coffs Coast	Kororo Nature Reserve	Kororo north	broad leaf pepper tree, palm grass, cocos palm, lantana, ochna, crofton weed	Moist eucalypt forest, Lowland rainforest EEC, *Kennedia retrorsa*	Eradication (broad leaf pepper, cocos palm), asset protection	Backpack spraying, splatter, cut paint	C-NE
Coffs Coast	Moonee Beach Nature Reserve	Back Sandy Beach	bitou bush, lantana, winter senna	Coastal woodland, Littoral rainforest EEC	Asset protection	Quadbike spraying, backpack spraying, cut and paint, hand pull	M-RA
Coffs Coast	Moonee Beach Nature Reserve	Bare Bluff	bitou bush, kikuyu, broad leaf paspalum, rhodes grass, giant parramatta grass, setaria	Themeda grassland, *Zieria prostrata, Pultenaea maritima, Plectranthus cremnus*	Asset protection	Backpack spraying, hand pull	C-TSC, H-CH, M-RA
Coffs Coast	Moonee Beach Nature Reserve	Dammerels APZ	winter senna	Littoral rainforest EEC, coastal woodland	Asset protection	Cut stump	M-RA
Coffs Coast	Moonee Beach Nature Reserve	Dammerels Headland	kikuyu, broad leaf paspalum, rhodes grass, giant parramatta grass, setaria, bitou bush, lantana, ground asparagus, corky passionfruit	Themeda grassland EEC, coastal woodland, *Zieria prostrata, Thesium australe, Pultenaea maritima, Chamaesyce psammogeton, Plectranthus cremnus*	Asset protection	Hand pull, backpack spraying	C-TSC, H-CH
Coffs Coast	Moonee Beach Nature Reserve	Diggers Point	kikuyu, broad leaf paspalum, rhodes grass, giant parramatta grass, setaria, bitou bush, winter senna	Themeda grassland EEC, coastal woodland, *Zieria prostrata, Pultenaea maritima, Plectranthus cremnus*	Asset protection	Hand pull, cut and paint, backpack spraying	C-TSC, H-CH, M-RA
Coffs Coast	Moonee Beach Nature Reserve	Fiddamans Beach	bitou bush	Coastal woodland, Littoral rainforest EEC	Asset protection	Backpack spraying, hand pull	M-RA
Coffs	Moonee Beach Nature Reserve	LAMN Groundsel	groundsel bush	Coastal woodland	Containment, asset protection	Cut stump, back pack spray	C-TSC
Coffs Coast	Moonee Beach Nature Reserve	Littoral Rainforest	camphor laurel, umbrella tree, lantana, bitou bush	Littoral rainforest EEC, Acianthus exiguus	Asset protection	Drill, cut stump, backpack spraying	C-TSC
Coffs Coast	Moonee Beach Nature Reserve	Look at me now headland	bitou bush, broadleaf paspalum, kikuyu, setaria, winter senna, rhodes grass	Themeda grassland EEC, *Zieria prostrata, Thesium australe, Pultenaea maritima, Chamaesyce psammogeton, Plectranthus cremnus*	Asset protection	Hand pull, frilling, cut and paint, backpack spraying	C-TSC, H-CH, M-RA

Coffs Coast	Moonee Beach Nature Reserve	Moonee Beach	bitou bush	Coastal woodland, littoral rainforest EEC, *Acianthus exiguus*	Asset protection	Hand pull, cut and paint, backpack spray, aerial spot spraying	M-RA
Coffs Coast	Moonee Beach Nature Reserve	Moonee Beach groundsel	groundsel bush	Swamp sclerophyll forest EEC, Saltmarsh EEC	Containment, asset protection	Cut stump	C-TSC
Coffs Coast	Moonee Beach Nature Reserve	Sandy APZ	broadleaf paspalum, kikuyu, setaria, winter senna, rhodes grass	Coastal woodland, Littoral rainforest EEC	Asset protection	Quickspray	M-RA
Coffs Coast	Moonee Beach Nature Reserve	Serenity Beach	bitou bush	Littoral rainforest EEC, coastal woodland	Asset protection	Hand pull, cut and paint, backpack spraying, Quadbike spraying	C-TSC
Coffs Coast	Muttonbird Island Nature Reserve	Muttonbird central area	turkey rhubarb, kikuyu, lantana, spiny burr grass	Themeda grassland EEC, littoral rainforest EEC, *Pultenaea maritima, Plectranthus cremnus*	Asset protection	Hand pull, backpack spraying	C-TSC, M-RA
Coffs Coast	Muttonbird Island Nature Reserve	Muttonbird madeira	madeira vine	Themeda grassland EEC, littoral rainforest EEC, *Pultenaea maritima, Plectranthus cremnus*	asset protection	Hand pull / dig out & vigilant gel	C-TSC. M-RA
Coffs Coast	Sherwood Nature Reserve	Gentle Annie Road	lantana, broadleaf paspalum, winter senna	Lowland rainforest EEC, *Amorphospermum whitei*	Asset protection	Backpack spraying, hand pull	M-RA
Coffs Coast	Sherwood Nature Reserve	Picnic area Entrance	lantana, broadleaf paspalum, winter senna, wandering jew	Lowland rainforest EEC	Asset protection	backpack spraying, hand pull	M-RA
Coffs Coast	Sherwood Nature Reserve	Plantation sites	lantana, broadleaf paspalum	Lowland rainforest EEC, moist eucalypt forest, *Senna acclinis, Amorphospermum whitei, Marsdenia longiloba, Alloxylon pinnatum*	Asset protection	Back pack, hand pull	C-TSC
Coffs Coast	Sherwood Nature Reserve	Powerline trail	broadleaf paspalum, lantana, winter senna	Lowland rainforest EEC, moist eucalypt forest	Asset protection	Backpack spraying, hand pull	M-RA
Coffs Coast	Sherwood Nature Reserve	Woopi Creek track and regen	broadleaf paspalum, blue billy goat, enviro weeds	Lowland rainforest EEC, *Senna acclinis, Amorphospermum whitei, Marsdenia longiloba, Alloxylon pinnatum*	Asset protection	Backpack spraying, hand pull	C-TSC

Coffs Coast	South Solitary Island Nature Reserve PNG	South Solitary Island	madeira vine, kikuyu, grasses, mother of millions	Themeda grassland, *Zieria prostrata, Plectranthus cremnus*	Asset protection	Backpack spraying	M-RA
Coffs Coast Area	Ulidarra National Park	End Peak base track and Ulidarra walking track	lantana, broadleaf paspalum	Moist eucalypt forest, Lowland rainforest EEC, *Parsonsia dorrigoensis*	Asset protection	Quad bike, splatter gun, hand pull	M-RA
Coffs Coast Area	Ulidarra National Park	Road camphors	camphor laurel, groundsel bush	Moist eucalypt forest, Lowland rainforest EEC, *Parsonsia dorrigoensis*	asset protection	Cut and paint	M-RA
Coffs Coast Area	Ulidarra National Park	Roads and trails	lantana, broadleaf paspalum, palm grass	Moist eucalypt forest, Lowland rainforest EEC	Asset protection	Quickspray	M-RA
Coffs Coast Area	Ulidarra National Park	Tallow trail	lantana, broadleaf paspalum	Moist eucalypt forest, Lowland rainforest EEC, *Parsonsia dorrigoensis*	Asset protection	Quad bike, splatter gun, hand pull	M-RA
Coffs Coast Area	Bollanolla Nature Reserve	Englands Rd camphor	camphor laurel	Lowland rainforest EEC	Asset protection	Cut and paint, stem inject, foliar spray	C-TSC
Coffs Coast Area	Bollanolla Nature Reserve	Reserve trails	lantana, broad leaf paspalum	Lowland rainforest EEC, moist eucalypt forest	Asset protection	Quickspray, boom spray, splatter gun	M-RA
Coffs Coast Area	Dunggir National Park	Dunggir, Hanging Rock & Kosekai Roads	giant parramatta grass, crofton weed, lantana	Lowland rainforest EEC, dry eucalypt forest, moist eucalypt forest	Asset protection	Boom spray, Quickspray	M-RA
Coffs Coast Area	Dunggir National Park	Kosekai Lookout	crofton weed, mistflower, giant parramatta grass	Lowland rainforest EEC, dry eucalypt forest, moist eucalypt forest	Asset protection	Quickspray	M-RA
Coffs Coast Area	Dunggir National Park	Wandering jew	wandering jew	Lowland rainforest EEC, moist eucalypt forest	Asset protection	Backpack spray	C-TSC
Coffs Coast Area	Gaagal Wanggaan (South Beach) National Park	Entire reserve	bitou bush, lantana, broadleaf paspalum, winter senna, groundsel bush, Rhodes grass, buffalo grass, torpedo grass, coastal morning glory	Littoral rainforest EEC, coastal woodland, estuarine wetlands, dry eucalypt forest / tall dry heath	Asset protection	Backpack spray, cut and paint, quickspray, splatter gun, hand pull	C-TSC, H-CH, M-RA,

Coffs Coast Area	Ganay Nature Reserve	Blairs & Rickerbys Rds	broad leaf paspalum, lantana	Lowland rainforest EEC, dry eucalypt forest, moist eucalypt forest	Asset protection	Boom spray	M-RA
Coffs Coast Area	Ganay Nature Reserve	Kennaicle Creek	lantana, blue billy goat weed	Lowland rainforest EEC, dry eucalypt forest, moist eucalypt forest, *Hicksbechia pinnatifolia, Parsonsia dorrigoensis*	Asset protection	Splatter gun	M-RA
Coffs Coast Area	Ganay Nature Reserve	The Slip	crofton weed, blue billy goat weed, whiskey grass	Lowland rainforest EEC, moist eucalypt forest, *Parsonsia dorrigoensis*	Asset protection	Quickspray	M-RA
Coffs Coast Area	Gumbaynggirr State Conservation Area	Little Wonder	broad leaf paspalum	Lowland rainforest EEC, moist eucalypt forest, *Niemeyera whitei, Parsonsia dorrigoensis*	Asset protection	Boom spray	M-RA
Coffs Coast Area	Jaaningga Nature Reserve	Basin and Rocky Wharf Rd	broad leaf paspalum, lantana	Lowland rainforest EEC, dry eucalypt forest, moist eucalypt forest, *Acacia chrysotrycha, Parsonsia dorrigoensis*	Asset protection	Hand pull, backpack spray, cut and paint	C-TSC
Coffs Coast Area	Jaaningga Nature Reserve	Basin Rd	broad leaf paspalum, lantana	Lowland rainforest EEC, moist eucalypt forest, *Acacia chrysotrycha, Parsonsia dorrigoensis*	Asset protection	Boom spray, quickspray	C-TSC
Coffs Coast Area	Jaaningga Nature Reserve	Edwards Knob Trail	broad leaf paspalum, lantana	Lowland rainforest EEC, dry eucalypt forest, moist eucalypt forest	Asset protection	Boom spray, quickspray	M-RA
Coffs Coast Area	Jaaningga Nature Reserve	Lantana ridge & Basin Rd	broad leaf paspalum, lantana	Lowland rainforest EEC, dry eucalypt forest, moist eucalypt forest, *Acacia chrysotrycha, Parsonsia dorrigoensis*	Asset protection	Cut and paint, back pack spray, hand pull	C-TSC
Coffs Coast Area	Jaaningga Nature Reserve	Western Boundary Trail	broad leaf paspalum, lantana	Lowland rainforest EEC, dry eucalypt forest, moist eucalypt forest	Asset protection	Boom spray, quickspray	C-TSC
Coffs Coast Area	Jagun Nature Reserve	Bill Sharmans contractor	singapore daisy	Littoral rainforest EEC, moist eucalypt forest	Eradication	Hand pull, back pack spray	C-TSC

Coffs Coast Area	Jagun Nature Reserve	Bitou bush staff	bitou bush	Littoral rainforest EEC, coastal woodland, moist eucalypt forest	Asset protection	Quickspray or quadbike, hand pull	C-TSC
Coffs Coast Area	Jagun Nature Reserve	Glory Lily	glory lily	Littoral rainforest EEC, coastal woodland, moist eucalypt forest	Asset protection	Backpack spray	C-TSC
Coffs Coast Area	Jagun Nature Reserve	Lantana staff	lantana	Littoral rainforest EEC, swamp sclerophyll forest EEC, coastal woodland, moist eucalypt forest	Asset protection	Quickspray or quadbike, hand pull	C-TSC
Coffs Coast Area	Jagun Nature Reserve	Post fire stage 2 contractor	lantana, bitou bush,winter senna, paspalum, groundsel bush, crofton weed	Littoral rainforest EEC, coastal woodland, moist eucalypt forest	Asset protection	Hand pull, backpack spray, cut and paint	C-TSC
Coffs Coast Area	Jagun Nature Reserve	Railway Sector, SW corner	lantana, senna, crofton weed, billy goat, groundsel bush	Littoral rainforest EEC, coastal woodland, moist eucalypt forest	Asset protection	Quickspray	C-TSC
Coffs Coast Area	Jagun Nature Reserve	Volunteers Jagun	lantana, bitou bush,winter senna, paspalum, groundsel bush, crofton weed	Littoral rainforest EEC, swamp sclerophyll forest EEC, coastal woodland, moist eucalypt forest	Asset protection	Hand pull, backpack spray, cut and paint	C-TSC
Coffs Coast Area	Juugawaarri Nature Reserve	All roads	broad leaf paspalum, giant parramatta grass, crofton weed	Lowland rainforest EEC, dry eucalypt forest, moist eucalypt forest	Asset protection	Boom spray	M-RA
Coffs Coast Area	Juugawaarri Nature Reserve	Bellbucca BMAD	lantana, mistflower	Lowland rainforest EEC, dry eucalypt forest, moist eucalypt forest	Asset protection	Quickspray	M-RA
Coffs Coast Area	Juugawaarri Nature Reserve	Cooks Creek	broad leaf paspalum	Lowland rainforest EEC, Parsonsia dorrigoensis	Asset protection	Quickspray	C-TSC
Coffs Coast Area	Ngambaa Nature Reserve	Allgomerra Creek Road	lantana, giant parramatta grass	Lowland rainforest EEC, dry eucalypt forest, moist eucalypt forest	Asset protection	Boom spray, quickspray	C-TSC
Coffs Coast Area	Ngambaa Nature Reserve	Browns and Farmers Rds	giant parramatta grass, lantana, wild tobacco	Lowland rainforest EEC, dry eucalypt forest, moist eucalypt forest	Asset protection	Boom spray, quickspray	M-RA
Coffs Coast Area	Ngambaa Nature Reserve	Cedar Park	lantana, winter senna	Lowland rainforest EEC, moist eucalypt forest, Senna acclinis, Nyemera	Asset protection	Splatter gun, quickspray, cut paint, hand pull	C-TSC

				whitei, Marsdenia longiloba, Parsonsia dorrigoensis			
Coffs Coast Area	Ngambaa Nature Reserve	Ennis & Bakers Rds	giant parramatta grass, lantana	Moist eucalypt forest, dry eucalypt forest, Marsdenia longiloba, Parsonsia dorrigoensis	Asset protection	Boom spray, quickspray	C-TSC
Coffs Coast Area	Ngambaa Nature Reserve	Ennis Rd	lantana	Moist eucalypt forest, dry eucalypt forest, Dodonaea megazyga, Marsdenia longiloba, Parsonsia dorrigoensis	Asset protection	Cut and paint, back pack spray, hand pull	C-TSC
Coffs Coast Area	Ngambaa Nature Reserve	Ennis rd / Greenhills Road area	lantana	Lowland rainforest EEC, moist eucalypt forest, Pomaderris queenslandica, Marsdenia longiloba, Parsonsia dorrigoensis	Asset protection	Cut and paint, back pack spray, hand pull	C-TSC
Coffs Coast Area	Ngambaa Nature Reserve	Miles Camp Water	lantana, moth vine	Lowland rainforest EEC, moist eucalypt forest, Marsdenia longiloba, Parsonsia dorrigoensis	Asset protection	Quickspray, hand pull moth vine	C-TSC
Coffs Coast Area	Valla Nature Reserve	Littoral rainforest	bitou bush, lantana, broad leaf paspalum, palm grass, cocos palm, singapore daisy, winter senna	Littoral rainforest EEC, Parsonsia dorrigoensis, Marsdenia longiloba	Asset protection,	Hand pull, backpack spray, cut and paint	C-TSC, M-RA
Coffs Coast Area	Valla Nature Reserve	Ocean view Rd creekline	lantana, winter senna, broad leaf paspalum	Littoral rainforest EEC, coastal woodland, moist eucalypt forest, Marsdenia longiloba	Asset protection	Backpack spray, cut paint, hand pull	M-RA
Coffs Coast Area	Valla Nature Reserve	Valla Beach Rd APZ	setaria, rhodes grass, giant parramatta grass, whiskey grass	Moist eucalypt forest	Asset protection	Wick wiping, spot spraying	M-RA
Coffs Coast Area	Valla Nature Reserve	Volunteers Valla	bitou bush, lantana, broad leaf paspalum, palm grass, cocos palm, singapore daisy, winter senna	Littoral rainforest EEC, coastal woodland, moist eucalypt forest, Marsdenia longiloba, Parsonsia dorrigoensis	Asset protection,	Hand pull, backpack spray, cut and paint	C-NE

Coffs Coast Area	Yarriabini National Park	Camphor	camphor laurel	Moist eucalypt forest, dry eucalypt forest, Marsdenia longiloba, Parsonsia dorrigoensis	Asset protection	Backpack spray, cut stump	M-RA
Coffs Coast Area	Yarriabini National Park	Kinki bananas	groundsel bush bush, lantana, crofton weed, barna grass, yellow bells, paspalum, passionfruit	Littoral rainforest EEC, moist eucalypt forest	Asset protection,	Quickspray, splatter gun, cut and paint, hand pull	C-TSC
Coffs Coast Area	Yarriabini National Park	Lookout	lantana, setaria, rhodes grass, giant parramatta grass, whiskey grass, farmers friends	Littoral rainforest EEC, moist eucalypt forest	Asset protection	Backpack spray, hand pull	M-RA
Coffs Coast Area	Yarriabini National Park	Main access trails	broad leaf paspalum, giant parramatta grass	Lowland rainforest EEC, dry eucalypt forest, moist eucalypt forest, Parsonsia dorrigoensis	Asset protection	Boom spray, quickspray	M-RA
Coffs Coast Area	Yarriabini National Park	Middle Head	bitou bush, lantana, setaria, rhodes grass, giant parramatta grass, whiskey grass, farmers friends	Themeda grassland EEC, littoral rainforest EEC, Thesium australe, Plectranthus cremnus	Asset protection	Backpack spray, cut and paint, hand pull	C-TSC
Coffs Coast Area	Yarriabini National Park	Middle Head West	bitou bush, lantana	Moist eucalypt forest, dry eucalypt forest	Asset protection	Quickspray, splatter gun, cut and paint, hand pull	C-TSC
Coffs Coast Area	Yarriabini National Park	Palm Nursery	lantana	Moist eucalypt forest, dry eucalypt forest	Asset protection	Quickspray, cut and paint, hand pull	M-RA
Coffs Coast Area	Yarriabini National Park	The Pines	lantana, broad leaf paspalum, giant parramatta grass	Lowland rainforest EEC, moist eucalypt forest, Marsdenia longiloba, Parsonsia dorrigoensis	Asset protection	Hand pull, backpack spray	M-RA
Coffs Coast Area	Yarriabini National Park	The tower	coreopsis	Cleared / grassland	Asset protection	Backpack spray, hand pull	C-NE
Hastings Area	Lake Innes Nature Reserve	Innes Ruins HS and surrounding Nature Reserve area	deer	Native vegetation, Native Browsers	Asset protection	Trapping, baiting trial, survey & monitoring	C-NE, C-EC, M-CP, L-PP

Hastings Area	All Reserves	Lake Innes Nature Reserve & new reported sightings	cane toad	Biodiversity	Eradication	Respond to reports, hand collection, night survey, public education	C-NE
Hastings Area	Werrikimbi National Park	Yarras / Birdwood Area	wild dog & dingo	Livestock predation on adjoining private land, dingo conservation in Sch 2 area	Asset Protection	Strategic 1080 baiting with neighbours, survey & monitor, CRC co-operative research program	C-EC
Hastings Area	Crowdy Bay National Park, Kattang Nature Reserve		fox	Nesting Shorebirds	Asset protection	1080 baiting to create buffer around nest sites	C-TSC
Hastings Area	All Reserves	Port Macquarie area	fox, cat, deer	Biodiversity	Asset Protection	Liaise with Port Macquarie City Council, Forests NSW, Lands Dept. To establish a cooperative feral animal control across all tenure	M-CP
Hastings Area	Queens Lake Nature Reserve		deer	Native vegetation, Native Browsers	Asset protection	Baiting trial, survey & monitoring	C-NE, M-CP
Hastings Area	Biriwal Bulga National Park		wild dog & dingo	Livestock predation on adjoining private land, dingo conservation in Sch 2 area	Asset Protection	Strategic trapping & 1080 baiting with neighbours, survey & monitor	C-EC
Hastings Area	Queens lake Nature Reserve, Crowdy Bay National Park, Lake Innes Nature Reserve , Dooragan National Park		wild dog & dingo	Livestock predation on adjoining private land, public risk	Asset Protection	Reactive trapping & 1080 baiting with neighbours, survey & monitor, assess and monitor public risk	C-EC, C-HD
Hastings Area	Woregore National Park	Pelican Island	fox	Threatened Shorebirds - Little Tern	Asset protection	Produce site plan, 1080 baiting to protect nest sites	C-TSC
Hastings Area	Middle Brother National Park	Acacia courtii	lantana	Acacia courtii, moist eucalypt forest	Asset protection	Splatter gun, cut and paint, backpack spray, hand pull	C-TSC
Hastings Area	Bago Bluff National Park	Bago roads	lantana	Dry eucalypt forest	Asset protection	Boom spray	L-LP

Hastings Area	Kattang Nature Reserve	Camden Head	whiskey grass, rhodes grass, bitou bush, lantana, bindii	Coastal woodland, littoral rainforest EEC, heath, high profile	Asset protection	Backpack, hand pull, cut and paint	C-TSC, M-RA
Hastings Area	Kattang Nature Reserve	Northern carpark	bindiis, whiskey grass, setaria, rhodes grass, paspalum	High profile, coastal woodland	Asset protection	Backpack, quickspray	M-RA
Hastings Area	Sea Acres	Castaways	bitou bush, kikuyu, paspalum urvillei	Littoral rainforest EEC, coastal woodland, high profile	Asset protection	Backpack, hand pull	C-TSC, M-RA
Hastings Area	Crowdy Bay National Park	Cathys Knob	bitou bush, lantana	Swamp sclerophyll forest EEC, core koala habitat	Asset protection	Quickspray	C-TSC
Hastings Area	Lake Innes Nature Reserve	Cattai Plains	bitou bush	Coastal woodland, high profile site	Asset protection	Quickspray	M-RA
Hastings Area	ComboyneNature Reserve	Comboyne privets	privets	Lowland rainforest EEC	Asset protection	Inject, cut and paint, backpack	C-TSC
Hastings Area	Crowdy Bay National Park	Crowdy Roads	setaria, whiskey grass, paspalum urvillei	Coastal woodland, littoral rainforest EEC, heath	Asset protection	Boom spray, quickspray	C-TSC, M-RA
Hastings Area	Crowdy Bay National Park	Diamond Head Camp Area	bitou bush, lantana, coastal morning glory	High profile, coastal woodland, littoral rainforest EEC	Asset protection	Hand, backpack	M-RA
Hastings Area	Dooragan National Park	Dooragan Acacia	lantana, bitou bush	*Acacia courtii*, moist eucalypt forest, lowland rainforest EEC	Asset protection	Bush regen	C-TSC
Hastings Area	Crowdy Bay National Park	Dunbogan Beach	bitou bush	Littoral rainforest EEC, coastal woodland	Asset protection	Quickspray, backpack	C-TSC
Hastings Area	Kattang Nature Reserve	Fire trail	black-eyed susan, asparagus, environmental weeds	Coastal woodland, high profile site	Asset protection	Backpack, quickspray, crown, hand pull	C-TSC
Hastings Area	Kattang Nature Reserve	Fishermans Bluff	lantana, rhodes grass, whiskey grass, paspalum, setaria	Coastal woodland, Themeda grassland EEC	Asset protection	Backpack, quickspray	C-TSC
Hastings Area	Queens Lake Nature Reserve	Ghost Rd East	lantana	Moist eucalypt forest, lowland rainforest EEC	Asset protection	Quickspray, backpack, hand pull	M-RA
Hastings Area	Sea Acres National Park	Harrys Gully	bitou bush, senna pendula, paspalum, setaria	Littoral rainforest EEC, coastal woodland, high profile site	Asset protection	Hand pull, backpack, cut and paint	C-TSC, M-RA
Hastings Area	Crowdy Bay National Park	Humbug Point	bitou bush, lantana, coastal morning glory	Swamp oak forest EEC, Swamp sclerophyll forest	Asset protection	Quickspray, backpack, hand pull, cut and paint	C-TSC

				EEC			
Hastings Area	Crowdy Bay National Park	Indian Head Camp Area	bitou bush, lantana, coastal morning glory	High profile site, coastal woodland, littoral rainforest EEC	Asset protection	Hand, backpack	C-TSC, M-RA
Hastings Area	Lake Innes NatureReserve	Innes Ruins HS	lantana, mysore thorn	High profile historic site, moist eucalypt forest	Asset protection,	Splatter gun, foliar spray, hand pull, cut and paint	C-NE, H-CH
Hastings Area	Crowdy Bay National Park	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	C-TSC, M-RA
Hastings Area	Crowdy Bay National Park	Kylies Beach	bitou bush	Coastal woodland, littoral rainforest EEC	Asset protection	Backpack, quickspray, aerial spray	C-TSC, M-RA
Hastings Area	Dooragan National Park	Lakeside	lantana, bitou bush	Moist eucalypt forest, lowland rainforest EEC	Asset protection	Cut and paint, foliar spray, hand pull	C-TSC
Hastings Area	Sea Acres National Park	Lighthouse Rd Pacific Drive	madeira vine, bitou bush, lantana, rhodes grass	Moist eucalypt forest, lowland rainforest EEC	Asset protection	Scrape and paint, cut and paint, foliar spray, hand pull	C-TSC
Hastings Area	Sea Acres National Park	Lighthouse Road carpark	whiskey grass, rhodes grass, bitou bush, lantana	High profile site, coastal woodland	Asset protection	Foliar spray, cut and paint, hand pull	M-RA
Hastings Area	Macquarie Nature Reserve	Little Owen	whiskey grass, rhodes grass, moth vine, lantana, camphor laurel	High profile site, moist eucalypt forest, lowland rainforest EEC	Asset protection	Hand pull, backpack, cut and paint	C-TSC
Hastings Area	Sea Acres National Park	Lookout Block	bitou bush, lantana, rhodes grass, paspalum mandiocanum	High profile site, moist eucalypt forest, lowland rainforest EEC	Asset protection	Hand pull, backpack, cut and paint	C-TSC
Hastings Area	Sea Acres National Park	Middle Track Area	bitou bush, lantana, rhodes grass, paspalum mandiocanum	High profile site, moist eucalypt forest, lowland rainforest EEC	Asset protection	Hand pull, backpack, cut and paint	C-TSC
Hastings Area	Sea Acres National Park	Miners Beach	bitou bush, lantana, rhodes grass, paspalum mandiocanum	High profile site, moist eucalypt forest, lowland rainforest EEC	Asset protection	Hand pull, backpack, cut and paint	C-TSC, M-RA
Hastings Area	Lake Innes Nature Reserve	Old Tip Site	various	Aesthetic impacts, biodiversity, public health	Asset protection	Mechanical clearing of rubbish, quickspray	M-RA
Hastings Area	Sea Acres National Park	Pandanus Shelly Beach South	bitou bush, lantana, rhodes grass, paspalum mandiocanum	High profile site, moist eucalypt forest, lowland rainforest EEC	Asset protection	Hand pull, backpack, cut and paint	C-TSC, M-RA
Hastings Area	Kattang Nature Reserve	Perpendicular Point	lantana, prickly pear, bitou bush, whiskey grass, rhodes grass, setaria,	Coastal woodland, themeda grassland EEC	Asset protection	Bush regen	C-TSC, M-RA

			paspalum				
Hastings Area	Queens Lake Nature Reserve	Queens Lake Picnic Area	lantana	Moist eucalypt forest, lowland rainforest EEC	Asset protection	Quickspray, backpack, hand pull	M-RA
Hastings Area	Dooragan National Park	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
Hastings Area	Werrikimbe National Park	Roadside weeds	setaria, rhodes grass, farmers friends, giant parramatta grass	World Heritage Area, aesthetic values	Asset protection	Boom and spot spray	M-RA
Hastings Area	Macquarie Nature Reserve	Roto track	camphor laurel	Moist eucalpyt forest, lowland rainforest EEC, high profile site	Asset protection	Cut and paint saplings, foliar spray seedlings	C-TSC, M-RA
Hastings Area	Roto Historic Site	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
Hastings Area	Crowdy Bay National Park	Sandy Point	lantana, coastal morning glory	Swamp oak forest EEC, swamp sclerophyll forest EEC	Asset protection	Quickspray, backpack spray, hand pull	C-TSC
Hastings Area	Sea Acres National Park	Shelly Beach Rd	bitou bush, lantana, rhodes grass, paspalum mandiocanum	High profile site, moist eucalypt forest, lowland rainforest EEC	Asset protection	Hand pull, backpack, cut and paint	C-TSC
Hastings Area	Dooragan National Park	Trig station	crofton weed, giant paspalum	High profile visitation site	Asset protection	quickspray	M-RA
Hastings Area	Kattang Nature Reserve	Washhouse Beach	lantana	Themeda grassland EEC, Thesium australe, coastal woodland	Asset protection	Foliar spray, cut and paint, hand pull	C-TSC
Hastings Area	Woregore Nature Reserve	Woregore	bitou bush, turkey rhubarb	Important bird breeding site	Asset protection	Quick spray, hand pull	M-RA
Hastings Area	Macquarie Nature Reserve	Zone 2	senna, lantana, camphor laurel	High profile site, moist eucalypt forest, lowland rainforest EEC	Asset protection	Cut and paint, foliar spray, hand pull	M-RA
Hastings Area	Macquarie Nature Reserve	Zone 3-4 Wattle Street	madeira vine, turkey rhubarb, moth vine, camphor laurel, lantana	Swamp sclerophyll forest, lowland rainforest EEC	Asset protection	Scrape and paint, cut and paint, foliar spray, hand pull	M-RA

Hastings Area	Macquarie Nature Reserve	Zone 6	lantana	High profile site, moist eucalypt forest, lowland rainforest EEC	Asset protection	Cut and paint, foliar spray, hand pull	M-RA
Hastings Area	Macquarie Nature Reserve	Zone 8 east	various	High profile site, moist eucalypt forest, lowland rainforest EEC	Asset protection	Cut and paint, foliar spray, hand pull	M-RA
Hastings Area	Macquarie Nature Reserve	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
Macleay Area	Maria National Park, Limeburners Creek National Park, Goolawah National Park, Goolawah Regional Park.	Maria River Wildlife Project	wild dog, fox, cat, pig	Ground Parrot, Quoll, Koala, Public Safety, Livestock predation on adjoining private land, dingo conservation in Sch 2 area	Asset protection,	Trapping, survey & monitoring, research, public education, sign positing	C-TSC, C-EC, C-HD, M-CP
Macleay Area	Fishermans Bend Nature Reserve	Loop and Bomaderry Trails	wild dog & dingo	Livestock predation on adjoining private land	Prevention	Reactive 1080 baiting with neighbours, trapping, survey & monitor	C-EC
Macleay Area	Hat Head National Park	Kilmores trail	wild dog & dingo	Livestock predation on adjoining private land	Prevention	Reactive 1080 baiting with neighbours, trapping, survey & monitor	C-EC
Macleay Area	Hat Head National Park	North west HHNational Park	fox	Public health	Eradication	Reactive 1080 baiting to create fox free buffer around public use areas & cooking faciltiies	C-HD
Macleay Area	New England National Park	Postmans trail, O'Neils, F Tree, Hickeys Ck Roads	wild dog & dingo	Livestock predation on adjoining private land, dingo conservation in Sch 2 area	Asset Protection	Strategic 1080 baiting with neighbours, survey & monitor	C-EC
Macleay Area	Willi Willi National Park, Boonangi Nature Reserve & SRA	Flat Top Rd, Double Head & Boonanghi Trail, Wombat Rd	wild dog & dingo	Livestock predation on adjoining private land, dingo conservation in Sch 2 area	Asset Protection	Strategic 1080 baiting with neighbours, survey & monitor	C-EC
Macleay Area	Yarrahapinni Wetlands National Park & Clybucca AA &	Broadwater	fox	Biodiversity	Eradication	Strategic 1080 baiting, trapping, survey & monitor	H-IH

	HS						
Macleay Area	Arakoon National Park	Trial Bay Goal & Visitor use areas	indian myna	Aesthetic impacts	Eradication	Trapping in conjunction with Macleay wide Indian Myna control program	M-RA, L-LP
Macleay Area	Arakoon National Park	Trial bay Goal	black rat	Historic Building	Asset Protection	Baiting with 1 st generation rodenticides	H-CH
Macleay Area	Off park	Various	cane toad	Biodiversity	Eradication	Hand collection, survey & monitor	C-NE
Macleay Area	New England National Park	Kilprotay & Hickeys Rd (proposed sites)	bell miner associated dieback	Native eucalypt forest	Asset Protection	Supporting BMAD ecologist site surveys	C-TSC
Macleay Area	Kumbertine National Park	TBD	bell miner associated dieback	Native eucalypt forest	Asset Protection	Supporting BMAD ecologist site surveys	C-TSC
Macleay Area	Hat Head National Park	Hat Head beach dunes	Gloriosa superba,	Littoral Rainforest EEC (EPBC-ce; TSC-e), Dune vegetation	Eradication	Spot spray ,physical removal	C-NE
Macleay Area	Hat Head National Park	Korogoro Ponit	Chrysanthemoides monilifera, Senna pendula var. glabrata, Lantana camara, Ipomoea cairica, Rubus anglocandidans, Paspalum urvillei,Asparagus aethiopicus	Littoral Rainforest EEC (EPBC-ce; TSC-e), Themeda Grassland on seacliffs and coastal headlands EEC (TSC-e), Casuarina equisetifolia [Bitou TAP - Medium],	Asset protection	Quickspray, backpack,splatter gun, cut/paint, biocontrol, hand removal,	C-TSC, M-CP,L-PP
Macleay Area	Hat Head National Park	Connors to Hungry Head beach access	Chrysanthemoides monilifera, Senna pendula var. glabrata, Lantana camara, Ipomoea cairica, Rubus anglocandidans, Paspalum urvillei,Asparagus aethiopicus	Littoral Rainforest EEC (EPBC-ce; TSC-e), Themeda Grassland on seacliffs and coastal headlands EEC (TSC-e), Casuarina equisetifolia [Bitou TAP - Medium],	Asset protection Eradication,	Quickspray, backpack,splatter gun, cut/paint, biocontrol, hand removal, aerial spray, abseiling bush regenerators	C-TSC, M-CP,L-PP
Macleay Area	Hat Head National Park	Swan Pool	Salvinia molesta	aquatic ecosystem	Asset protection	Prepare plan, use integrated pest amanagement.	, M-CP, ,L-PP
Macleay Area	Goolawah National Park	Racecourse Headland	Chrysanthemoides monilifera, Senna pendula var. glabrata, Lantana	Littoral Rainforest EEC (EPBC-ce; TSC-e), Themeda Grassland on	Asset protection,	backpack,splatter gun, cut/paint, biocontrol, hand removal,	C-TSCL-LP

			camara, Ipomoea cairica, Paspalum urvillei,Asparagus aethiopicus	seacliffs and coastal headlands EEC (TSC-e), Casuarina equisetifolia [Bitou TAP - Medium],			
Macleay Area	Goolawah National Park	Racecourse Beach	Chrysanthemoides monilifera, Senna pendula var. glabrata, Lantana camara, Ipomoea cairica, Paspalum urvillei,Asparagus aethiopicus	Littoral Rainforest EEC (EPBC-ce; TSC-e), Coastal Dune Communities	Asset protection	Quickspray, aerial spraybackpack,splatter gun, cut/paint, biocontrol, hand removal	C-TSC, M-CP,L-PP
Macleay Area	Goolawah National Park & Goolawah Regional Park	Delicate Beach	Baccharis halimifolia, Chrysanthemoides monilifera, Senna pendula var. glabrata, Lantana camara	Littoral Rainforest EEC (EPBC-ce; TSC-e), Coastal Dune Communities	Asset Protection	Quickspray, backpack,splatter gun, cut/paint, biocontrol, hand removal	C-TSC, M-CP,L-PP
Macleay Area	Goolawah National park	Stage 2 additions	Baccharis halimifolia, Chrysanthemoides monilifera, Senna pendula var. glabrata, Lantana camara, garden escapes	Swamp sclerophyll forest on coastal floodplains EEC (TSC-e) Coastal Dune communities. .	Asset Protection	Prepare plan and implement control	C-TSC
Macleay Area	Limeburners Creek National Park	Big Hill	Baccharis halimifolia, Chrysanthemoides monilifera, Senna pendula var. glabrata, Lantana camara, Ipomoea cairica	Littoral Rainforest EEC (EPBC-ce; TSC-e), Themeda Grassland on seacliffs and coastal headlands EEC (TSC-e), Casuarina equisetifolia [Bitou TAP - Medium],	Asset Protection	Quickspray, backpack,splatter gun, cut/paint, chainsaw, biocontrol, hand removal	C-TSC, M-CP,L-PP
Macleay Area	Limeburners Creek National Park	North Shore Beach	Chrysanthemoides monilifera, Senna pendula var. glabrata, Lantana camara, Ipomoea cairica, Paspalum urvillei,Asparagus aethiopicus	Littoral Rainforest EEC (EPBC-ce; TSC-e), Themeda Grassland on seacliffs and coastal headlands EEC (TSC-e)Sub-tropical Coastal Floodplain Forest EEC (TSC-e), Swamp oak floodplain forest EEC (TSC-e), Swamp sclerophyll forest on	Asset Protection	Quickspray, aerial spray, backpack,splatter gun, cut/paint, chainsaw, biocontrol, hand removal	C-TSC, M-CP,L-PP

				coastal floodplains EEC (TSC-e). .			
Macleay Area	Limeburners Creek National Park	Point Plomer	Chrysanthemoides monilifera, Senna pendula var. glabrata, Lantana camara, Ipomoea cairica, Paspalum urvillei,Asparagus aethiopicus	Littoral Rainforest EEC (EPBC-ce; TSC-e), Themeda Grassland on seacliffs and coastal headlands EEC (TSC-e), Casuarina equisetifolia [Bitou TAP - Medium],	Asset Protection	Quickspray, backpack,splatter gun, cut/paint, chainsaw, biocontrol, hand removal	C-TSC, M-CP,L-PP
Macleay Area	Limeburners Creek National Park	Barries Bay	Chrysanthemoides monilifera, Senna pendula var. glabrata, Lantana camara, Ipomoea cairica,	Littoral Rainforest EEC (EPBC-ce; TSC-e), Themeda Grassland on seacliffs and coastal headlands EEC (TSC-e)Sub-tropical Coastal Floodplain Forest EEC (TSC-e), Swamp oak floodplain forest EEC (TSC-e), Swamp sclerophyll forest on coastal floodplains EEC (TSC-e). .	Asset Protection	Quickspray, backpack,splatter gun, cut/paint, , biocontrol, hand removal	C-TSC, M-CP,L-PP
Macleay Area	Limeburners Creek National Park	Queens Head	Chrysanthemoides monilifera, Senna pendula var. glabrata, Lantana camara, Ipomoea cairica, Paspalum urvillei,Asparagus aethiopicus, Pennisetum clandestium	Littoral Rainforest EEC (EPBC-ce; TSC-e), Themeda Grassland on seacliffs and coastal headlands EEC (TSC-e), Casuarina equisetifolia [Bitou TAP - Medium],	Asset Protection	Quickspray, backpack,splatter gun, cut/paint, chainsaw, biocontrol	C-TSC, M-CP,L-PP
Macleay Area	Limeburners Creek National Park	Back Plomer Beach	Chrysanthemoides monilifera, Senna pendula var. glabrata, Lantana camara, Ipomoea cairica, Pennisetum clandestium	Sub-tropical Coastal Floodplain Forest EEC (TSC-e), Coastal Saltmarsh EEC (TSC-e), Swamp oak floodplain forest EEC (TSC-e), Swamp sclerophyll forest	Asset Protection	Quickspray, backpack,splatter gun, cut/paint, chainsaw, biocontrol, hand removal	C-TSC, M-CP,L-PP

				on coastal floodplains EEC (TSC-e)			
Macleay Area	Goolawah National Park & Goolawah Regional Park	Campground program	Erhrarta erecta Panic Veldt Grass ohrysanthemoides monilifera subsp. rotundata, Lantana camara, Senna pendula,	Littoral Rainforest EEC (EPBC-ce; TSC-e), Acianthus exiguous [ROTAP 3RC, Bitou - High], Sophora tomentosa (TSC-e) Chamaesyce psammogeton (TSC-e), Calystegia soldanella Bitou TAP high, Stackhousia spathulata [Bitou TAP - High], Vigna marina [Bitou TAP - High], Gleichenia mendellii [Bitou TAP - High], Acrostichum speciosum, Marsdenia liisae [ROTAP] [Bitou TAP - Low], Themeda grassland on headlands EEC (EPBC-ce; TSC-e), Swamp sclerophyll forest on coastal floodplains EEC (TSC-e), coastal Banksia forest,	Asset Protection	Quickspray, backpack,splatter gun, cut/paint, , biocontrol, hand removal	M-RA ,L-PP
Macleay Area	Clybucca Aboriginal Area	Golden Hole South	Baccharis halimifolia, Lantana camara, Ipomoea cairica,, Arauja hortorum, Rubus anglocandicans, Senna pendula var. glabrata	Swamp Oak forest EEC (TSC-e), Coastal Saltmarsh EEC (TSC-e), Mangrove vegetation, Aboriginal cultural heritage	Asset Protection	Quickspray, backpack,splatter gun, cut/paint, , biocontrol, hand removal	C-TSC, M-CP ,L-PP
Macleay Area	Clybucca Aboriginal Area	Madeira rainforest	Anredera cordifolia, Ligustrum sinense, Cinnamomum camphora, Lantana camara	Littoral Rainforest EEC (EPBC-ce; TSC-e), Aboriginal cultural heritage	Asset protection	backpack, cut/scrape/paint, hand removal,	C-TSC, H-CH
Macleay Area	Yarrahappini Wetlands National Park	North Eastern fringe	Morus alba, Lantana camara, Ipomoea cairica,, Arauja hortorum, Senna pendula var. glabrata	Swamp sclerophyll forest on coastal floodplains EEC (TSC-e), littoral rainforest EEC, Swamp	Asset Protection	Quickspray, backpack,splatter gun, cut/paint, , biocontrol, hand removal	C-TSC

				Oak forest EEC (TSC-e),			
Macleay Area	Yarrahappini Wetlands National Park	Western Regeneration Paddocks	Baccharis halimifolia, Cinnamomum camphora, Lantana camara, Senna pendula var. glabrata	Swamp sclerophyll forest on coastal floodplains EEC (TSC-e), , Swamp Oak forest EEC (TSC-e), Subtropical Coastal Floodplain Forest (TSC-e)	Asset Protection	Quickspray, backpack,, cut/paint, , biocontrol, hand removal	M-CP
Macleay Area	Yarrahappini Wetlands National Park	Naturally vegetated parts of the reserve poor access	Baccharis halimifolia	Swamp sclerophyll forest on coastal floodplains EEC (TSC-e), , Swamp Oak forest EEC (TSC-e),	Asset Protection	Cut/paint, , biocontrol, hand removal	M-CP
Macleay Area	Fishermens Bend Nature Reserve	Eastern section of reserve	Lantana	Dry and Moist Eucalypt forests, riparian vegetation	Asset Protection	Quickspray, backpack,splatter gun, cut/paint, , biocontrol, hand removal	
Macleay Area	Yessabah Nature Reserve	Yessabah Nature Reserve	Lantana camara, Arauja hortorum, Cinnamomum camphora	Lowland subtropical rainforest on limestone	Asset Protection	Quickspray, backpack,splatter gun, cut/paint, , biocontrol, hand removal	C-TSC, M-CP ,L-PP
Macleay Area	The Castles Nature Reserve	Haydonville east section	Lantana camara, Rubus anglocandidans, Arauja hortorum	World Heritage Area	Asset protection, eradication	Quickspray, backpack,splatter gun, cut/paint, , biocontrol, hand removal	H-IH
Macleay Area	Willi Willi National Park	WHA Toorumbee Ck	Lantana camara	World Heritage Area	Asset protection,	Aerial spray, quadbike,backpack, hand removal, biocontrol.	C-TSC
Macleay Area	Willi Willi National Park	Carrai/Coachwood Roads	Rubus anglocandidans,	World Heritage Area	eradication	Quickspray, backpack,	C-NE, M-CP
Macleay Area	Goolawah National Park	Goolawah Lagoon	Salvinia molesta, Eichornia crassipes	aquatic ecosystem	Asset Protection	Prepare plan, use integrated pest amanagement.	M-RA, M-CP, ,L-PP
Macleay Area	Western Reserves	Willi Willi National Park, Boonanghi National Park, Kumbatine National Park/SCA, Yarravel Nature	Lantana camara , Cinnamomum camphora, Senna pendula var glabrata	Dry and Moist Eucalypt forests, riparian vegetation	Asset Protection	Develop weed management strategy and implement control	M-CP

		Reserve, Pee Dee Nature Reserve, Fifes Nob Nature Reserve, New England National Park, Cooperbung Creek Nature Reserve, Skillion Nature Reserve					
Macleay Area	New England National Park	Hickeys Creek	tropical soda apple		Eradication,	survey/inspection, physical removal and disposal off site.	C-NE
Macleay Area	Hat Head National Park	Swan Pool	Salvinia molesta	aquatic ecosystem	containment	Prepare plan, use integrated pest amanagement.	, M-CP, ,L-PP

6. Consultation

The North Coast Region Regional Pest Management Strategy was developed through consultation with the community and internal staff. A Pest Management Strategy Stakeholder Forum was conducted at Coffs Harbour on the 8th September 2011. A diverse range of community representatives were present including members of local councils, Livestock Health and Pest Authorities, NSW Farmers Association, Catchment Management Authorities and several other stakeholder groups. Key issues raised from this forum were:

- the need for appropriate and long term resources to be available for pest management programs (refer to Goal 3 Objective 3.1 in Part A);
- the requirement for cooperation and landscape scale pest management programs (refer to Goal 2 Objective 2.2 in Part A);
- the need for a risk assessment approach to pest management (refer to Goal 2 Objective 2.1 in Part A);
- the requirement that high priority pest management programs be those that prevent the establishment of new pest populations (refer to Goal 1 Objective 1.1 in Part A);
- the development of staff, communities and volunteers skills in order to build the capacity of NPWS to identify and treat pests (refer to Goal 3 Objective 3.3 in Part A);
- the need for communication and education of stakeholders (refer to Goal 3 Objective 3.2 in Part A);and

the requirement to measure the effectiveness of the Pest Management Strategy (refer to Goal 3 Objective 3.4 in Part A);

Many other issues were identified with a variety of views and opinions expressed. The report detailing these is available from the North Coast regional office or any of the attendees. Where possible this feedback is incorporated as identified above or into the approaches for managing specific pests (refer to Sections 5 & 7 Part B). Some suggestions were outside the scope of this strategy such as those requiring a legislative or policy response while other issues at a broader level such as environmental pest management across the landscape were discussed at the state level forum.

Workshops were also conducted within each National Park Area with Managers, Rangers and Field Staff in order to collaboratively identify and prioritise pest management programs for each Area using the practical knowledge and experience of staff. Following the preparation of this draft Pest Management Strategy, the document was placed on public exhibition and comments were invited from the community, other government agencies and stakeholder groups.

7. Pest species overviews

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

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

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

http://www.invasiveanimals.com/

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

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

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

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

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

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

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Wild dog (*Canis lupus spp.*) for North Coast Region

Distribution and abundance

Wild dogs are divided into three groups. Dingoes, which arrived in Australia between 4600 and 18300 years ago (Oskarsson et al. 2011), Feral dogs – domestic dogs living in the wild, and hybrids - the result of cross-breeding between dingoes and feral dogs.

Dingoes originally occurred throughout NSW but today populations of wild dogs, including dingoes occur mainly in the east of the state on public and private lands along the Great Dividing Range and coastal hinterlands. The IUCN elevated the global (Asia–Australia) status of dingoes to Vulnerable in 2004 (Corbett 2008). In 2008 the Dingo was listed as threatened in Victoria under the *Flora and Fauna Guarantee Act* 1988 (Victorian Scientific Advisory Committee 2008). The dingo is not listed as threatened in NSW.

Wild dogs are present in low to medium densities throughout the NCR on private, Forests NSW and NPWS lands. In the NCR 28 national parks and nature reserves are identified Dingo Management Areas listed on Schedule 2 of the RLPB Wild Dog Pest Control Order.

NPWS has engaged in a program of DNA analysis of wild dogs in Coastal Branch and the Northern Tablelands. This program is directed by a Standard Operating Procedure with the goal being to deliver a coordinated approach to identifying the genetic composition of wild dogs and dingoes to inform wild dog control and the management of Schedule 2 lands for dingo conservation.

In North East NSW over 800 wild dog DNA samples collected from trapping and wild dog control programs on NPWS, Forests NSW, and private lands have been analysed by NPWS (see table). A significant proportion of the samples are collected from the interface area between livestock operations and Schedule 1 & 2 lands. Results show hybridisation between dingoes and domestic dogs is occurring. Pure dingoes still exist in NE NSW with 15% of those sampled were pure or likely pure dingo. Samples to date indicate the broader wild dog population is made up of predominantly dingo and dingo hybrids with 90% of the sample found to be more dingo than feral dog (ie. >50% dingo). The degree of hybridisation that may significantly compromise the ecological roles and the genetic and behavioural integrity of dingo populations is not yet understood.

DNA Results	**Percentage**
Pure or Likely Pure Dingo	15.1%
>75% Hybrid Dingo	15.2%
65-75% Hybird Dingo	29.1%
50-64% Hybrid Dingo	30.3%
<50% Hybrid Feral Dog	7.6%
Feral Dog	2.7%

In NCR dingo populations of conservation significance have been identified in New England NP, Cathedral Rock NP, Guy Fawkes River NP, and Limeburners Ck NP. Conservation of dingoes in an environment where they are also a declared pest species remains a significant challenge.

Impacts

Wild dogs, including dingoes (*Canis lupus dingo*) and feral dogs (*Canis lupus familiaris*) can cause significant livestock losses to the pastoral industry. Livestock affected include sheep, goat, and cattle. For this reason the Rural Lands Protection Act 1998 declares wild dogs, including dingoes as a pest animal throughout NSW. Under this Act the NPWS is required to eradicate (continuously suppress and destroy) wild dogs to the extent necessary to minimise the risk of the pest causing damage on any land. To balance the conservation of dingoes with the need for wild dog control the Pest Control Order under the Act allows for lands listed on Schedule 2 of the Order, to be managed through a wild dog management plan with both control and conservation objectives. In NCR 28 national parks and nature reserves are identified as Dingo Management Areas and are listed on Schedule 2. In these Schedule 2 reserves the NCR seeks to find a balance between conserving dingoes and controlling dingoes and other wild dogs where they impact on livestock operations.

In NCR wild dog impacts occur where forested and gorge areas interface with fine wool sheep country such as the south western boundary of the Guy Fawkes River National Park and western boundary of the Cathedral Rock National Park. Impacts on cattle operations are most pronounced during calving and typify the impact issues in coastal and escarpment reserves of the NCR.

Predation and hybridisation by feral dogs (*Canis lupus familiaris*) are listed by the NSW Scientific Committee as a Key Threatening Process. The KTP distinguished between dingoes and feral dogs (ie. wild dogs derived from domestic dogs). The KTP identifies the threat of hybridisation to the dingo by feral dogs and identifies fauna threatened by predation from feral dogs: Spotted-tailed quoll, southern brown bandicoot, koala, eastern ground parrot, pied oyster catcher, hooded plover and little penquin.

Hybridisation between feral dogs and dingoes may lead or has already led to the Dingo becoming threatened (Dickman and Lunney 2001). There is a growing body of evidence that dingoes play an important role as 'trophic regulators' in natural ecosystems, and that they contribute ecosystem function and can assist in protection of native species by controlling the density of red foxes, cats, goats, pigs and other feral species (*e.g*. Glen *et al*. 2007; Johnson *et al*. 2007; Wallach and O'Neill 2008, Wallach *et al*. 2010, Letnic *et al*. 2011).

The role of feral dogs and hybrids in replacing dingoes as trophic regulators remains uncertain (Daniels and Corbett 2003; Glen and Dickman 2005; Mitchell and Banks 2005), in part due to the potential differences between the taxa in their density, hunting behaviour, social structure and body size. Maintenance of dingo pack structure within identified dingo Management Areas (Schedule 2 lands) is seen as important to minimise further hybridisation and predation impacts on neighbouring livestock operations. The NSW Scientific committee proposes the most realistic approach to reducing the threat of hybridisation between domestic dogs and dingoes is to quarantine 'pure' or relatively pure dingoes from domestic dog genes by establishing dog-free buffers around key dingo populations.

Dingo habituation and aggression towards park visitors has been identified as a potential risk in popular camp grounds in Yuraygir NP, Crowdy Bay NP, Limeburners Ck NP and Goolawah NP in the NCR NPWS have produced a policy and procedures document to control the risk to humans from wild dogs (DECCW 2009).

Control

Integrated pest management control techniques will be used to manage wild dogs in the NCR. Wild dog control will be undertaken in partnership with the local Livestock Health & Pest Authority, Wild Dog Control Associations (WDCA) and individual landholders. Strategic control options to minimise the impact of wild dogs on livestock operations include:

- 1080 poison baits, M44 ejectors and trapping in accessible areas

- Exclusion or barrier fencing along the boundaries of reserves such as Guy Fawkes River NP and Cathedral Rock NP, where the terrain is suitable and there is sufficient funding and support from neighbouring landholders
- Aerial baiting in rugged inaccessible areas where other control techniques may not be suitable

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

- 1080 positon baiting and M44 ejectors
- Trapping using either NPWS staff or contract trappers
- "Howling up" and shooting

In high public use areas where a dingo risk to humans has been identified then preventative and reactive risk controls as detailed in the 2009 Policy will be implemented. Risk controls include signage at camp sites, brochures, public education programs, restricting access to food waste, hazing, modification of washing & fish cleaning facilities and removal of aggressive animals.

Priorities for control

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

Priority areas for "strategic" wild dog control in North Coast Region are Werrikimbie, Birwal Bulga, New England, Willi Willi, Guy Fawkes River, Yuraygir and Cathedral Rock national parks & Boonaghi & Bagul Waajaarr nature reserves. "Reactive" wild dog control programs are also implemented when required in an additional 16 national parks and nature reserves (see pest animal priority program tables).

Wild dog management plans are prepared in conjunction with the local Livestock Health & Pest Authorities (LHPA) and Wild Dog Control Associations (WDCA). The plans include the dual aims of minimising livestock predation and the conservation of the dingo in the core areas of all reserves listed under Schedule 2 of the Wild Dog Pest Control Order.

Priorities for wild dog control on reserves in North Coast Region are based primarily on the level of livestock predation reported by adjoining landholders, in accord with the relevant wild dog management plans. Wild dog control measures will be focused on areas of reserves where there are current and/or historic records demonstrating significant impact on livestock from wild dogs emanating from the reserves. There will be close liaison with the local WDCA and landholders when developing control programs.

NPWS will continue to work with LHPA to develop and review wild dog management plans and work cooperatively with the Northern Tablelands, Northern Rivers and Mid Coast LHPAs. NPWS commitments in these plans include both strategic and reactive control wild dog programs including implementing cooperative 1080 baiting in conjunction with neighbours in problem areas.

Monitoring

North Coast Region maintains a database of stock loss reports, wild dog activity and DNA results. Stock losses caused by wild dogs in the Northern Tablelands LHPA are recorded by the LHPA. Stock loss information is essential in planning and evaluating the effectiveness of control programs. Wild dog and prey fauna activity is measured annually using sandpads in priority reserves. In addition, the Region works cooperatively with the CRC for Invasive

animals and PhD student research projects that study wild dog impacts, effectiveness of wild dog control techniques, and dingo ecological function

DNA samples are analysed from all wild dogs trapped in NPWS programs. Dingoes in high visitor use areas will be monitored using techniques including sandpads, wildlife cameras, unique identification markers, satellite and radio tracking.

Cane toad *(Bufo marinus) for North Coast Region*

Distribution and abundance

Cane toads are restricted to the northern region of NSW, with well-established colonies occurring in the Tweed River Valley, Byron and Lismore areas contiguous with the species' distribution throughout tropical regions of northern Australia. Their range extends along the coast as far south as Yamba, with isolated colonies around Angourie, Mororo-Ashby and Brooms Head. A former colony at Port Macquarie is considered to be eradicated as no sightings have been found in the last three years. Established colonies of cane toads have been found up to 90km west of Ballina with the western boundary currently situated west of Kyogle/Casino and south to the Bungawalbin-Woodburn- Evans Head area. Vagrants are regularly reported in Sydney, Wollongong, Coffs Harbour and the Central Coast area. Vagrant reports are typically only one animal often found near tourist parks or landscape/nursery supplies or along railway or highway corridors reflecting their transport vector.

Impacts

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^{o}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. Summers in Northern NSW provide ideal breeding conditions for cane toads. Females lay between 8,000-35,000 eggs at a time and may lay two clutches each year.

The invasion and establishment of cane toads has been listed as a Key Threatening Process under both NSW (TSC Act) and Commonwealth (*Environment Protection and Biodiversity Act 1999*) threatened species legislation.

The native species most likely to be impacted at the population level in North Coast Region include tiger quoll, goannas, frog eating snakes and certain bird species. Native invertebrates are predated.

Priorities for control

Priorities for control are guided by the 2011 NPWS Cane Toad Plan. This plan proposes a containment line where populations outside the containment line will be eradicated. In North Coast Region this is the population in northern Yuraygir NP around the Brooms Head area. Within the containment line (outside NCR) the approach is asset protection where key assets at risk are identified and managed.

Preventing the establishment of new populations and maintaining and developing community interest and awareness in cane toad control is also important in managing this pest species. In the absence of any other agency or organisation willing to undertake this important function NPWS will continue to provide an initial response to new reports of cane toads outside of NPWS managed areas and undertake community awareness programs associated with on park programs or new incursions.

Control

Cane toad management in North Coast Region is largely undertaken by NPWS staff, contractors and volunteers with assistance from Department Primary Industries and local government. Raising public awareness and encouraging members of the public to hand in suspected live toads minimises the likelihood of native frogs being accidentally killed.

Sightings and reports from the public are crucial in providing a quick response to new incursions. Control methods include nocturnal surveying and collecting with limited use of traps. Novel methods such as the use of detection dogs are also being explored. NPWS is also providing support to the University of Sydney research project aimed at identifying biodiversity impacts in northern NSW and assessing the applicability of newer control techniques developed by the University of Sydney.

Monitoring

North Coast Region will attempt to confirm and document any new sighting of a cane toad in national parks in North Coast Region. Survey and collection data will be entered into Wildlife Atlas and reviewed annually for distribution to key stakeholders.

Red fox (*Vulpes vulpes*) for North Coast Region

Distribution and abundance

Foxes occur in most environments in Australia; however, they are generally most abundant in agricultural areas with patches of uncleared vegetation, as these areas provide abundant food, cover and den sites. In contrast, foxes appear to be rare in closed forest distant from cleared land.

Impacts

The introduction of foxes into Australia has had a devastating impact on native fauna, particularly among medium-sized (450-5000g) ground-dwelling and semi-arboreal mammals, ground-nesting birds and freshwater turtles. Recent studies have shown that predation by foxes continues to suppress remnant populations of many such species. Foxes have caused the failure of several attempts to reintroduce native fauna into areas of their former range. Predation by foxes was the first *key threatening process* to be listed under the NSW *Threatened Species Conservation Act 1995*. Foxes are also significant predators of domestic stock including poultry and lambs with the potential to reduce lambing rates significantly.

Native species most likely to be impacted at the population level in NCR include little terns, beach stone curlew, pied oystercatcher, bush stone curlew, brolga, emus, rufous bettong, brush-tailed rock wallaby, and freshwater turtles. A range of other species including wedgetailed shearwaters, bandicoots, brush turkeys and brush tailed possums are also impacted.

Priorities for control

The NSW Fox Threat Abatement Plan identifies high priority sites for fox control in North Coast Region. These are:

- Yuraygir NP Mid - Beach Stone Curlew, Pied Oystercatcher, Little Tern
- Yuraygir NP South - Beach Stone Curlew, Pied Oystercatcher, Little Tern
- Sawtell/Bongil Bongil NP- Little Tern
- Hearnes lake/Coffs Coast RP – Little Tern
- Nambucca Heads / Gaagal Wanggaan NP - Little Tern, Beach Stone Curlew

A Chaelundi-Kangaroo River site (rufous bettongs) was removed as a priority due to very low density of foxes; The Grange and Glenugie (rufous bettongs, Forests NSW) sites are non treatment sites.

Fox impacts on breeding wedgetailed sheartwaters on the Muttonbird Island Nature Reserve are addressed through den fumigation on adjoining lands and 1080 baiting when required.

Fox control for general biodiversity conservation in other reserves will occur if resources are available and the program does not impact on existing priority programs. Fox control to assist agricultural production will be considered on a case by case basis, however NPWS assistance will be limited to participation in cooperative baiting schemes.

Control

Regular systematic baiting using 1080 is the preferred method of fox control and is used throughout the region. This is supplemented by soft-jaw trapping, den fumigation and shooting.

Monitoring

The impact of fox predation on the priority species and conversely, the effectiveness of the control program are being assessed through long-term monitoring of priority species at the sites and fox populations. Rufous bettong populations are being measured annually via cage trapping. Shorebirds are monitored by counting adults, eggs and fledglings. Fox and other medium-sized mammal populations are being measured biannually via track counts on sandpads at rufous bettong sites. At shorebird sites fox activity is monitored through a combination of bait take and sandpads. Data is analysed by the NPWS Pest Management Unit and published periodically as part of the review of the Fox Threat Abatement Plan.

Feral cat (*Felis catus*) for North Coast Region

Distribution and abundance

Cats have been present in Australia at least since European settlement, and may have arrived as early as the 17th century. Today the distribution of feral cats is nationwide exploiting a wide variety of habitats including open plains, tropical, sub-tropical and temperate forests, alpine & sub alpine regions, deserts and the rural and peri urban landscapes.

Feral cats are solitary and predominantly nocturnal. Studies in western NSW have shown that males usually occupy a home range of 280 hectares, while females had smaller ranges of about 150 hectares but this may be larger if food supplies are scarce. They are less common in closed forests, preferring open, dryer habitats such as grasslands. Although no specific systematic surveys have been undertaken for feral cats in the North Coast Region, it is believed that they are present to varying degrees in all reserves, particularly near main urban centres. Sandpad surveys are conducted in priority reserves to monitor introduced predator densities including feral cats. Feral cats have been identified as posing a biodiversity threat in Bongil Bongil NP, Coffs Coast RP, Cascade NP, Mt Hyland NR, Dorrigo NP, New England NP, Yuraygir NP, and Iluka NR

Impacts

Feral cats are carnivores and can survive with limited access to water. They generally eat small mammals, but also catch birds, reptiles, amphibians, fish and insects, taking prey up to the size of a brush-tail possum.

There is clear evidence that feral cats have had a significant impact on island fauna. On the mainland, they contributed to the extinction of many small to medium sized mammals and ground-nesting birds; particularly in the arid zone. In some instances, feral cats have directly threatened the success of recovery programs for endangered species. The Commonwealth Threat Abatement Plan for Predation by Feral cats (2008) lists 36 mammal, 35 bird, seven reptile, and three amphibian native species that are threatened and are known or perceived to be under threat from cats. Mammals most vulnerable to predation by cats are species weighing less than 200grams (Denny & Dickman 2010).

Threatened species recorded in North Coast Region known to be predated on by feral cats include Hastings River Mouse *Pseudomys oralis*, Little Tern *Sterna albifrons* and Brush-tailed Rock Wallabies *Petrogale penicillata*.

Feral cats carry infectious diseases such as toxoplasmosis and sarcosporidiosis, which can be transmitted to native animals, domestic livestock and humans.

Predation by feral cats is listed as a key threatening process under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act) and the NSW *Threatened Species Conservation Act 1995* (TSC Act). Direct predation probably has the greatest impact on native prey species, but competition, transmission of parasites and diseases, and indirect interactions with natives are also likely to occur (Denny & Dickman 2010).

Priorities for control

In the North Coast Region feral cat control programs will be conducted as required at endangered shorebird nesting sites in Bongil Bongil NP, Coffs Coast RP, and Yuraygir NP. NPWS North Coast Region will continue to implement opportunistic control and cooperative programs with concerned neighbours and undertake trapping in other identified problem areas.

NPWS North Coast Region will continue to support research into feral cat control and utilise any appropriate new control techniques.

Control

Control of feral cats is problematic as they are hard to trap, do not readily take baits unless during periods of food shortage, and generally difficult to shoot as they avoid human contact. Even if cats are removed from an area, it is quickly recolonised (Dept. Environment and Heritage, 2004).

Registration of the vertebrate pesticide sodium fluoroacetate (1080) is currently being sought for the control of feral cats where conditions for its use are suitable. Audible recorded lures for feral cats and other predators are available through a number of sources. Night shooting is assisted by the cat's distinctive, green eyeshine. Rubber-jawed, leg-hold traps can be laid in the same manner as they are laid for wild dogs and foxes. Cats can also be trapped in wire 'treadle-type' box traps although this method is most practical for semi-feral urban cats (Qld Natural Resources, 2006).

Monitoring

Sand pads across forest tracks can provide some indication of feral cat numbers in remote locations and will continue to be recorded as part of the implementation of the Fox Threat Abatement Plan.

Feral deer (family Cervidae) for North Coast Region

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*).

All deer species present in NSW have patchy distributions in forest and woodland in eastern New South Wales, with two species (Red and Fallow Deer) extending west of the Great Dividing Range (Adam 2004).

Deer live in herds with complex social organisation, often involving considerable competition between males in the breeding season. Deer are generally cryptic and although there is no state-wide census of numbers, deer populations in NSW are believed to have increased dramatically in recent years. This is mainly attributed to escapes and deliberate releases from deer farms, expansions of acclimatisation herds and possibly in some areas deliberate translocation by hunters (Adam 2004).

They are nocturnal or semi-nocturnal, sheltering by day in forest or woodland and emerging to graze from late afternoon to early morning in native grassland, improved pasture, crop or other agricultural land.

Within North Coast Region, Feral Deer are known to occur in Lake Innes NR (Rusa Deer), Queens Lake NR, Guy Fawkes River NP (Rusa Deer), New England NP (Red & Fallow Deer), Bellinger River NP (Red & Fallow Deer) and Dunggir NP (Fallow Deer). Feral deer (Chital deer) are present on private and Forests NSW lands in the Bruxner Park area north of Coffs Harbour. Rusa, Fallow, Chital & Red Deer are present on private and Forests NSW lands in the Port Macquarie area.

Impacts

“Herbivory and environmental degradation caused by feral deer” have been declared a Key Threatening Process under the TSC Act.

Feral deer can have major impacts in parks and reserves, by:

- destroying native plants. Deer can trample plants; graze on them, and ring-bark young trees. Deer can have a major impact on the variety and abundance of plant species where populations are high;
- fouling waterholes;
- causing soil erosion;
- transmitting diseases such as foot-and-mouth disease, and;
- spreading weeds.

High densities of feral deer have been found to reduce understorey plant species in the Endangered Ecological Community Littoral Rainforest by as much as 70%. Feral deer populations elsewhere in the State have had significant impacts on the rare temperate and sub-tropical Illawarra rainforest, the threatened species *Syzigium paniculatum*, Littoral rainforest around Port Macquarie and trampling and browsing of threatened species in the Oxley Wild Rivers National Park (Adam 2004). Deer have been found to browse on lantana, crofton weed, mistflower and mother of millions (Moriarty et al 2000). The dietary overlap between Rusa Deer and the Swamp wallaby (*Wallabia bicolour*) is estimated to be 15 – 50%, with one deer eating approximately the same amount of vegetation as three swamp wallabies (DEC 2005).

Feral deer on roads have caused several major car accidents in NSW in recent years. On the Pacific Highway and local roads in the Port Macquarie area feral deer are recorded as

causing up to seven road crashes per year with the highest incidence of deer associated crashes occurring in the winter months (MNC Feral Deer Working group 2011).

Control

A number of techniques are available for the control of Feral Deer including shooting (DECC, contract & private recreational shooters), fencing, 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. Trials using cyanide based pelletised baits are underway to assess the suitability of this control technique for feral deer control.

Given the current population level of wild deer, there is a 'window of opportunity' to control the current 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 veterinarian/s and recreational shooters. The game council has formed the Port Macquarie - Hastings Hunting Group who undertake culling of nuisance wild deer in consultation with NSW Police and local RSPCA officers.

Priorities for control

Ensure no new populations of feral deer establish on NPWS lands. Investigate and where appropriate implement species specific control programs to remove feral deer populations from NPWS lands. Priority sites for deer control are Lake Innes NR, Queens Lake NR and Guy Fawkes River NP

Implement reactive control programs for wild deer in response to a significant impact on a reserve's values or neighbours.

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

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 report control efforts. The recording of incidence will be undertaken cooperatively by stakeholder members of the MNC wild deer working group.

Feral goat (*Capra hircus*)

Distribution and abundance

Goats (*Capra hirtus*) occur through the Great Dividing Range, in the semi-arid rangelands of NSW, QLD, Victoria and WA, and highlands of Tasmania. Their distribution appears is limited by adequate water supplies, and where the dingo is absent or uncommon.

In North Coast Region limited sightings of feral goats have been made in the Guy Fawkes River, Cathedral Rock, and Dooragan National Park's and Queens Lake NR. They are recorded in the Comboyne plateau area near Boorganna NR. There is potential for feral goats to occur in other reserves in the Region.

Impacts

Feral goats compete with fauna and livestock for fodder, water and shelter, as well as cause damage to heritage sites, and are potential vectors of livestock diseases (e.g. internal parasites and diseases such as "foot and mouth" and foot-rot).

Grazing and browsing by feral goats has significant impacts on native vegetation. It can lead to changes in species composition as more palatable species are eaten and removed, as well as changes in vegetation structure. Areas with a high density of goats have a conspicuous browse line, as all foliage within their reach is consumed. Feral goats can survive on highly fibrous, low nutrient herbage, provided sufficient water is available and will consume litter, fruit fall, bark and sticks. This can lead to a decrease in overall cover and an increase in bare ground, 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 through competition for food and shelter.

Competition and habitat degradation by feral goats has been listed as a *key threatening process* under the NSW *Threatened Species Conservation Act* (TSC Act).

Priorities for control

Cathedral Rock, Guy Fawkes River, Dooragan NPs and Queens Lake NR - monitor populations and control as required

Control

Effective control of feral goats requires an integrated approach using several complementary control techniques. In NCR, the main control techniques will be aerial and ground shooting and trapping programs. In addition, if adjoining landholders adjacent to reserve boundaries have feral goats they will be encouraged to reduce feral goat numbers through mustering and trapping. The maintenance of native dingo populations is likely to assist in controlling feral goat populations in NCR reserves. The potential 'window of opportunity' will be implemented should drought conditions see an aggregation of goat herds. Trials using cyanide based pelletised baits may be carried out to assess the suitability of this control technique for feral goat control.

Monitoring

Sightings to be monitored and strategies implemented as appropriate. Maintain liaison with neighbours and LHPAs.

Rabbit (*Oryctolagus cuniculus*) for North Coast Region

Distribution and abundance

Rabbits are found in most habitats throughout Australia below the tropic of Capricorn where there is suitable harbour or soil for digging warrens. They do not generally occur above 1500m altitude, or in dense forests, or on black soil plains. Moderate densities of rabbits occur in a number of reserves (see pest distribution tables). Most reserves however in the North Coast Region are not ideal habitat for rabbits.

Impacts

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

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

Priorities for control

The highest priority sites in North Coast Region are Guy Fawkes River NP, Dorrigo NP, and Yuraygir NP. Densities of rabbits in these reserves are generally low, however where numbers have increased control programs have been implemented in these locations.

Other prioritiy areas for control are:

- High public use areas such as picnic areas where the lawns are favoured by rabbits
- Where opportunistic surveys in known locations highlight an increase in densities and associated negative impacts
- Where rabbit populations have the potential to impact on threatened flora and fauna species

Control

Effective control of feral rabbits requires an integrated approach using several complementary control techniques. In North Coast Region, the main control techniques are 1080 baiting, pindone baiting, and RHD baiting. Warren fumigation is only used occasionally and warren ripping rarely, due to the remote nature of most populations and as rabbits do not always use warrens in coastal areas.

Monitoring

During field inspections, GPS will be used to collect raw data, such as the location of warrens and above ground harbours where rabbits are seen to shelter. This data will be incorporated into management maps generated using GIS.

As most significant rabbit populations within North Coast Region are found in remote areas, rabbit population abundances will be monitored using opportunistic recordings of warrens and counts of active entrances.

Feral pig (*Sus scrofa*) for North Coast Region

Distribution and abundance

Domestic pigs were introduced to Australia at the time of European settlement as a food source, and by the 1880's were regarded as a pest in several areas of western NSW and Victoria. Today there are estimated to be between 13 million and 23 million pigs in Australia. Significant populations occur in all states and territories except Tasmania.

Feral pigs are mainly found along watercourses and floodplains and in hot weather they are usually found within two kilometers of water. Densities vary depending on conditions, with about one feral pig per square kilometer in eucalypt woodland, forest and grazing land, and as many as 10–20 in wetlands and seasonally inundated floodplains. Feral pigs are active from late afternoon to early morning. They eat a wide range of foods including plants and small animals, and they will scavenge on dead animals. Adult male feral pigs (boars) generally roam alone over an area of up to 43 square kilometers, while females (sows) range over areas smaller than 20 square kilometers (DEH, 2006).

Within North Coast Region, pigs are most common in the New England tableland area and in the lower Clarence floodplain. Populations of pigs occur in Cathedral Rock NP, Guy Fawkes River NP, and Yuraygir NP. Feral pigs are also known to occur in Yarriabini NP, Crowdy Bay NP, Lake Innes NR, Werrikimbe NP, Limeburners Creek NR, Maria NP, Carrai NP, Goolawah NP, Kumbatine NP, and Willi Willi NP. Feral pigs are believed to have been released recently into Bongil Bongil NP by persons unknown.

Impacts

Feral pigs are a serious environmental and agricultural pest. Predation, habitat degradation, competition and disease transmission by feral pigs is listed as a Key Threatening Process through the relevant National (EPBC Act) and State (TSC Act) legislation. Feral pigs are listed as a declared pest under the Rural Lands Protection Act.

Feral pigs have significant impacts on the environment, including:

- Eating or destroying native plants and animals;
- Wallowing in, fouling and disturbing soils in dams, waterholes and other moist or swampy areas.
- Creating drainage channels in swamps;
- Digging for food. This can have major impacts on vegetation and forest litter, particularly along drainage lines and around swamps and lagoons, or after rain when the ground is softer. These actions destabilise stream banks and accelerate erosion;
- Eating frogs, reptiles, birds and small mammals, and;
- Spreading weeds and possibly disease.
- Spread of the soil borne pathogen *Phytophthora cinnamomi* belonging to the water mould group (*Oomycetes*). *P. cinnamomi* has been recorded Werrikimbe NP and is thought to be present in areas of Willi Willi NP. Infection of native plants by *P. cinnamomi* is listed as a KTP under the TSC Act (NSW Scientific Committee, 2002a) and the EPBC Act. *P. cinnamomi* may contribute to plant death where there are other stresses present such as waterlogging, drought, and perhaps wildfire (NSW Scientific Committee, 2002a).

Feral pigs can be a serious agricultural pest. They eat and destroy grain crops, improved pastures, and damage fences. They have been known to kill and eat up to 40% of newborn lambs. Feral pigs carry endemic diseases such as leptospirosis, brucellosis and meliodosis (Dept. Environment and Water Resources 2006).

Control

Techniques available to control feral pigs include shooting, trapping and baiting. Traps built near areas where pigs are active, such as watering holes can be successful when baited with grain. 1080 baiting is also used in some areas.

In Cathedral Rock NP the 'Judas pig' technique has been utilised, where their gregarious nature enables pigs fitted with radio collars to guide shooters to the location of other feral pigs. The maintenance of native dingo populations is likely to assist in controlling feral pigs populations in North Coast Region reserves.

Illegal hunting of pigs on NPWS lands is discouraged as it can result in escape of pig dogs, release of domestic pigs by shooters, damage to traps being used by NPWS and safety concerns to the general public. Extended drought can provide a window of opportunity for control of wild pigs due to their need for regular water.

Priorities for control

Cooperative control programs with park neighbours and the RLPB will continue to be supported by NPWS. Control programs focus on trapping and baiting in areas of current activity. On the Dorrigo Plateau / Ebor area, traps have been built by NPWS staff and loaned to park neighbours to improve the success of off park control programs.

High priority sites for control programs include Cathedral Rock NP, where a long-term program has been in place to reduce pig impacts on endangered ecological communities in the park, and Yuraygir NP to reduce pig impacts on native flora and fauna, watercourses and wetlands in the area. Feral pig control will also be undertaken within Werrikimbe and Willi Willi NPs when required to complement programs undertaken by Northern Tablelands Region on the western section of Werrikimbe NP and in Oxley Wild Rivers NP. Other pig control programs will be reactive in association with local LHPAs.

Monitoring

The number of pigs trapped or shot is recorded during control programs. Feral pig sightings and evidence of rooting behaviour are recorded by NPWS staff. Reports from park neighbours are also recorded

Feral horse (*Equus caballus*) for North Coast Region

Distribution and abundance

In NSW, feral horses (*Equus caballus*) are a significant problem within a number of conservation reserves along the Great Dividing Range and eastern seaboard. English (2001a) estimated the population of feral horses in NSW as between 5000 and 8000 horses. Conservation reserves in NSW where horses are a significant problem include Guy Fawkes River, Kosciusko, Oxley Wild Rivers, Yuraygir, Barrington Tops, Blue Mountains, and Kanangra-Boyd NPs and Yerranderie SCA. Feral horses are also present on lands adjoining most of these reserves.

A significant population of feral horses occur in the Guy Fawkes River NP. A survey in 2010 calculated the horse population as in excess of 1000 horses. Feral horses also occur in Yuraygir NP and the adjoining State Forests and private properties.

Impacts

Feral horses accelerate erosion through trampling, compaction and grazing. They also impact on native vegetation and ground-nesting birds, foul water holes and contribute to the spread of weeds. In the Guy Fawkes River NP a four year study into the impact of feral horses found horses in the park compete with kangaroos displacing them from prime feeding habitats. Horse trampling significantly reduced the stability of the soils surface and the infiltration and nutrient cycling capacity of the soils (Lenehan 2010). At a landscape scale feral horses altered the spatial organisation and patterning of landscapes over several spatial scales, resulting in a significant loss of functional integrity. The study also found that in areas occupied by feral horses the resources on hillslopes and spurs that normally sustain or enhance ecosystem production and function via feedback loops, such as seeds, litter, organic matter and rainfall, were more likely lost down slope rather than retained and recycled (Lenehan 2010).

In high altitude alpine herb fields trampling and grazing of bog and fen communities creates gully lines along horse trails that drain these sensitive communities. In water catchment areas, feral horse impacts accelerate soil erosion that increases sedimentation and potential transference of dangerous pathogens into water supplies. As horse density within conservation reserves increase their impacts on the environment become more significant.

Priorities for control

The removal of feral horses from Guy Fawkes River NP, to reduce ecological damage and competition with native grazers. Staged control program to create horse free management zones in the park with ultimate aim to remove all horses from the reserve. Control of feral horses in Yuraygir NP, to minimise environmental impacts and reduce risk to vehicular traffic and impacts on neighbouring private property.

Control

Different horse control techniques are required depending on factors such as season, feed availability, site accessibility, and horse density. A fully integrated suite of control techniques have been considered and combinations of different techniques have been assessed and are used to control feral horses. In North Coast Region the initial control method will be the use of feed based lures to draw horses into portable trap yards. Captured horses are then transported from the park and made available to identified horse interest groups for re-homing. Other control techniques will be developed and may be utilised later in the program as required. All feral horse control will be carried out in accordance with endorsed Codes of Practice and Standard Operating Procedures.

Monitoring

The overall effectiveness of horse removal programs will be assessed by measuring the reduction over time of the horse population in the park, monitoring the reduction of feral

horse populations within identified horse management zones, and reduction in feral horse density and distribution.

Introduced rodents for North Coast Region

Black rat (*Rattus rattus*), brown rat (*Rattus norvegicus*), and house mouse (*Mus musculus*)

Distribution and abundance

Two species of introduced rodents are recorded in North Coast Region, the black rat (*Rattus rattus*) and house mouse (*Mus musculus*). The black rat and house mouse are widely distributed across all of NCR, and are particularly abundant in the Muttonbird Island NR, semi-urban and urban reserves. The brown rat (*R. norvegicus*) is likely to be present along coastal break walls on major rivers in the region.

Impacts

Introduced rodents prey on many native animals including nesting birds, reptiles and insects. They also compete with native wildlife for food, and can prevent plant regeneration by consuming seeds and damaging seedlings. Predation by *Rattus rattus* on Lord Howe Island is listed as a KTP under the TSC Act (NSW Scientific Committee, 2000b) where it has already been responsible for the extinction of five species of birds and numerous invertebrates. These rats also cause substantial economic loss to the island's palm seed industry. The black rat is a known carrier of several diseases, including leptospirosis and salmonellosis, transmitted to humans through its urine and faeces.

In NCR introduced rodents have an impact on Muttonbird Island NR at Coffs Harbour, where black rats and house mice are significantly affecting the breeding success of wedge-tailed shearwaters (*Puffinus pacificus*). Shorebird breeding success on Pelican Island (Woregore NR) is suspected of being impacted by predation by introduced rodents.

The populations of black rats in campgrounds in Arakoon SCA and Crowdy Bay NP can pose a public health risk to visitors and in Trial Bay Goal (Arakoon NP) they cause damage to heritage property. At Sea Acres and Dorrigo Rainforest Centres infestations of black rats are an ongoing issue.

Priorities for control

The control of introduced rodents to minimise their impact on the breeding success of nesting seabirds on Muttonbird Island NR and Woregore NR are a priority. Rodent control will be implemented in Arakoon SCA/NP, Crowdy Bay NP, Dorrigo and Sea Acres Rainforest Centres as required.

Control

Rodent control on Muttonbird Island NR will be implemented in accordance with the strategy detailed in the Conservation Risk Assessment (NPWS 2010). An Integrated Management Plan for the control of the black rat in Trial Bay Camp Ground in Arakoon SCA (NPWS, 2001b) has been prepared to minimise the potential impacts of any control programs on the brush-tailed phascogale (*Phascogale tapoatafa*) which also occurs at this location. Introduced rodent control programs will be implemented at Crowdy Bay NP and Sea Acres NR, and as required in other reserves and off-park situations.

All programs will be implemented in an environmentally responsible manner to minimise potential non-target impacts. First generation multi dose rodenticides such as Coumatetralyl and Diphacinone will be used to minimise the off target impacts of all rodent control programs.

Monitoring

Monitoring of nesting seabird breeding success in response to rodent control will be monitored on Muttonbird Island NR and Woregore NR. Damage caused by rodents at heritage sites and camp grounds will be monitored and rodent control effort adjusted accordingly. Amount of bait take by rodents will be recorded. On Muttonbird Island NR rodent activity, distribution and abundance will be monitored using chew tags and elliot trapping.

Feral birds for North Coast Region

Indian myna (*Acridotheres tristis*), common starling (*Sturnus vularis*), sparrow (*Passer domesticus*), and spotted turtle-dove (*Streptopelia chinensis)*.

Distribution and abundance

Feral birds are generally found in association with human habitation with medium to high densities in urban and rural areas, and those fringing reserves. Indian mynas and common starlings have increased and expanded their habitat to include open pasture lands and open forest.

Feral birds are now distributed throughout North Coast Region, particularly in the coastal areas adjoining major towns and cities. Indian mynas are a relatively new incursion in Nort Coast Region. They have only been recorded in the region in the past eight years, but have rapidly expanded and are now present in most towns within in the region.

Impacts

Impacts of feral birds include competition for hollow nesting sites of birds, bats and mammals, spread of weed species and competition for food resources. Indian mynas are very intelligent and aggressive birds that are known to evict native birds: parrots, kookaburras and pee wees from their nests, dump their eggs, chase them away from their nests, and drive them from the area. In urban habitats they are considered to be a threat to the long term survival of native birds. Common starlings additionally contaminate nesting sites by filling hollows with deep linings that attract parasites and become unusable for other species that use little lining. Both Indian mynas and starlings are well known for their impact on human habitation where serious infestations of bird lice can occur.

Priorities for control

- Control programs will be implemented where feral birds impact on significant species or Endangered ecological communities (EEC).
- Control programs may also be implemented where feral birds are impacting on recreation and aesthetic values at high profile public visitor areas.
- The North Coast Region will encourage community groups through their local Landcare groups, non government organisations (NGOs), and council to undertake control programs to reduce the spread of the birds in their areas.
- The region will continue to support the Environmental Trust funded programs for Indian myna control operating in the Coffs Harbour, Bellingen, Nambucca, Macleay and Hastings areas.

Control

Trapping using specially designed cage traps in conjunction with feed based lures and decoy birds is the most effective control method. Control programs coordinated by local Landcare groups and NGOs are being implemented off park in all council areas in the NCR.

Monitoring

Feral bird sightings will be recorded, monitor population spread, and liaise with relevant stakeholders. NPWS will assist in the design of off park Indian myna control program monitoring techniques.

Feral honeybees for North Coast Region

Distribution and abundance

Feral honeybees (*Apis mellifera*) are known to exist in many reserves across NCR, however their distribution has not been mapped. Anecdotal evidence suggests that they are more abundant in urban and coastal reserves.

Impacts

Honeybees impact on biodiversity via competition for tree hollows, and competition for floral resources, such as pollen and nectar. The loss of tree hollows via occupation by feral honey bees reduces the number of hollows available for native animals to breed and shelter. This is of particular concern for species which are threatened. Hollows are an extremely important resource for many Australian animals, particularly birds and mammals.

Threatened species which are likely to be affected by competition from honeybees for hollows include the brush-tailed phascogale (*Phascogale tapoatafa*), squirrel glider (*Petaurus norfolcensis*), yellow-bellied glider (*Petaurus australis*), Major Mitchell cockatoo (*Cacatua leadbeateri*), glossy black cockatoo (*Calyptorhynchus lathami*), superb parrot (*Polytelis swainsonii*), and regent parrot (*Polytelis anthopeplus*). Populations of protected species that may become threatened include the common brushtail possum (*Trichosurus vulpecular*), greater glider (*Petauroides volans*), and sugar glider (*Petaurus breviceps*) (NSW Scientific Committee, 2002). Competition from feral honeybees is listed as a KTP under the TSC Act (NSW Scientific Committee, 2002b).

Priorities for control

Priority sites for control will be feral honeybee hives inhabiting hollow bearing trees at locations where threatened hollow dependent fauna have been recorded.

Control

A professional pest controller will be consulted. In most situations control will be via the application of a registered insecticide. In some situations it may be appropriate to engage a local apiarist to remove the feral honeybee population.

Monitoring

Visual inspections will be undertaken following treatments to confirm hive destruction.

Feral fish for North Coast Region

Plague minnow or gambusia (*Gambusia holbrooki*), koi carp (*Cyprinus carpio koi*), rainbow trout (*Oncorhynchus mykiss*), brown trout (*Salmo trutta*), redfin perch (*Perca fluviatilis*) and goldfish (*Carassius auratus*).

Distribution and abundance

Many fish species have been introduced into NSW waters over the past 200 years, both intentionally and accidentally. Feral fish species can threaten native aquatic and terrestrial life directly as predators or competitors for food or indirectly by altering their natural habitat.

In freshwater aquatic habitats the introduction of exotic fish species to areas outside their natural range, have occurred widely for the purposes of recreational fishing, mosquito control (plague minnow) and aquaculture. There have also been an increasing number of introductions through the intentional or accidental release of aquarium fish.

Four feral fish species are currently of concern in NCR: gambusia; koi carp; rainbow trout; and brown trout. Redfin perch have been recorded in the Macleay Catchment, and goldfish have been recorded in both the Macleay and Manning Catchments, although it is not known whether these species occur on NPWS reserves (Kaye, pers. comm., 2008).

Predation by plague minnow is listed as KTP under the TSC Act (NSW Scientific Committee, 1999b). This species is recorded from a number of coastal and near urban reserves (Lake Innes NR, Yarrahapinni Wetlans NP, Crowdy Bay NP and Hat Head NP). A survey of relic dams from the post-sandmining era in coastal parks recorded their presence in the majority of dams.

Koi Carp, measuring approximately 35cm in length, has been recorded, trapped and electrofished in the southern reaches of Wrights Creek in Macquarie NR.

Brown trout and rainbow trout are highly likely to be present in the streams of most of the region's escarpment parks from release and restocking programs prior to reserve dedication.

Impacts

Some of these species, most notably trout, are seen as having social and economic benefits for recreational fisheries and have been actively maintained through stocking. However, their impact on aquatic biodiversity in NCR waterways is not fully understood. Further research is required to better understand the terrestrial and aquatic species likely to be at most risk from predation by trout, with a particular emphasis on threatened stream dwelling frogs.

Koi carp and the plague minnow are now considered strictly as pests in the wild, as they alter or degrade the natural environment and compete with native species for food, habitat or spawning grounds.

The plague minnow has been colloquially described as the 'animal weed' of our aquatic environment, because of its ability to rapidly reproduce, disperse widely and occupy diverse habitats, to the detriment of native species. This small fish is highly aggressive and predatory.

Carp are listed as a Class 1 Noxious Species in NSW under the noxious species provisions of the Fisheries Management Act 1994. Carp are widely believed to have detrimental effects on native aquatic plants, animals and general river health, particularly through their destructive feeding habits. Some probable impacts of carp include: reducing water quality; increasing the likelihood of algal blooms; causing erosion; impacting on invertebrates and aquatic plants; potential disease outbreaks; and reduction in native fish numbers.

Priorities for control

Koi carp in Macquarie NR are a pest that the community has identified as a high priority for action at the local level and has been identified in the Macquarie NR draft Pest Strategy.

Both the Port Macquarie-Hastings Council and NSW Fisheries support a collaborative program. Koi Carp can threaten the conservation, cultural heritage or recreational values of an area. There existed a window of opportunity and for which continued management is necessary to maintain benefits gained from previous control programs on this species in the Port Macquarie – Wrights Creek environs.

Due to the complexity and difficulty of effectively controlling plague minnows, any control will only be attempted where a potential effective outcome is possible or the site has some priority in relation to threatened species.

Brown trout and rainbow trout, or other associated recreational fish, will only be controlled in line with policy or further direction from within the agency. In some cases it may be necessary to prevent the introduction and reduce populations of non-native fish in streams where vulnerable native animal species occur (Haering, pers. comm., 2008).

Control

There are presently no species specific methods to control plague minnow (draining a waterbody or using the pesticide 'rotenone' will destroy the target species but both methods are not species specific). Once established in a waterway plague minnow are almost impossible to eradicate, the difficulty increases where there are connected waterways such as creeks, rivers and streams, and large permanent water bodies. A number of physical, chemical and biological approaches have been trialled with varying degrees of success and inherent risks. Actions identified in the Plague Minnow TAP (NPWS, 2003) are targeted predominantly towards ameliorating the impacts on frogs, particularly threatened species. In NCR, this particularly applies to threatened species such as the green & golden bell frog, giant burrowing frog and wallum froglet. There are many other species potentially impacted in NCR as detailed in the TAP.

Current management strategies for koi carp in Macquarie NR include electrofishing to stun, catch and euthanase. Electrofishing involves passing an electric current through water via electrodes which stuns nearby fish, leading to their disorientation and easy capture. Electrofishing can be dangerous and therefore operators require a high level of training and rigorous safety standards must be followed. NSW Fisheries have used this method in Wrights Creek in the recent past with success.

Carp can be also be opportunistically netted and euthanased in Wrights Creek. This method has also been effective in the recent past, however is very time consuming and not as nearly as effective as electrofishing. Rehabilitation of Wrights Creek is important in order to change the aquatic environment to favour native fish.

Monitoring

NCR will continue to monitor the distribution and abundance of koi carp in Macquarie NR and the success of management strategies. Water quality and carp abundance will also be monitored in conjunction with NSW DPI. Research will be supported to better understand the terrestrial and aquatic species at risk from predation by trout, with a particular emphasis on threatened stream dwelling frogs.

Bitou bush (*Chrysanthemoides monilifera* ssp. rotundata) for North Coast Region

Distribution and abundance

Bitou bush is widespread in all coastal reserves in the North Coast Region. Most foredunes and hind dunes are or have been heavily infested. It has also established in coastal heath and woodlands, littoral rainforest and grassy headlands.

Impacts

Bitou bush is a highly competitive weed that smothers native plant communities and destroys natural habitat and food sources for native animals. It threatens over 180 native plant species, populations and ecological communities in NSW. Bitou bush invades dunes, coastal heathlands, grasslands, woodlands and forests (DEC 2006). Bitou bush can also disturb cultural heritage sites by destroying the fabric of the site. It can provide food and shelter to feral animals, such as the red fox.

Bitou bush is a Weed of National Significance, and is declared Class 4 under the *Noxious Weeds Act 1993* in the six coastal councils in North Coast Region (Port Macquarie-Hastings, Kempsey, Nambucca, Bellingen Coffs Harbour, Clarence Valley). National, state and regional strategies have been prepared. The invasion of native plant communities by bitou bush is listed as a key threatening process under the NSW *Threatened Species Conservation Act 1995*, and a threat abatement plan (the bitou TAP) was prepared in 2006 and subsequently implemented.

Bitou bush infestations threaten the conservation values of endangered ecological communities such as littoral rainforests and Themeda grassy headlands in Coffs Coast Regional Park, Bongil Bongil, Yuraygir, Hat Head, Goolawah, Limeburners Creek, Crowdy Bay and Dooragan national parks, and Moonee Beach, Sea Acres and Kattang nature reserves. Invasion by bitou bush is the key threat to several endangered plants in the North Coast Region including *Thesium australe*, *Chamaesyce psammogeton*, *Zieria prostrata*, *Acronychia littoralis* and *Sophora tomentosa*. Forty sites are identified in the NSW Bitou Bush TAP. Of these, 30 are listed as Category 1 (highest priority) sites.

Priorities for control

The bitou bush TAP identifies 31 priority sites for control in North Coast Region:

- Yuraygir NP – Angourie Pt, Angourie Back Beach, Bare Point-Wilsons Headland, Sandon Bluffs, Sandon north and south beaches, Sandon River, Redcliff, Station Ck Beach, Rocky Pt, Shelley Headland, Dirragan Headland, Plumbago Headland, Pebbly to Freshwater
- Coffs Coast RP – Diggers Head, Woolgoolga Beach and Headland, Macauleys Headland, Cabins Beach, Arrawarra Headland, Woolgoolga to Sandy Beach and north east of Korora
- Moonee Beach NR – Look-at-me-now Headland, Dammerels Headland, Diggers Point, Bare Bluff
- Bongil Bongil NP
- Yarriabini NP – Middle Head
- Arakoon NP
- Hat Head NP – Big Smoky, Conners-Hat Head, East of Town and Headland, O'Connor's Beach,
- Crowdy Bay NP – North, South, Diamond Head, Sea Acres NR - Tacking Point, Miner's Beach;
- Kattang NR;
- Limeburners Creek NR;
- Clybucca HS.

Control programs are being implemented at all of these sites and vary between initial works to follow up and expansion of treatment areas as resources become available. Requirements have changed at some sites due to control success, re-infestation and / or need to treat other weeds. Many of these programs involve working with other stakeholders such as community groups.

Other control priorities include:

- Treatment of isolated infestations especially along roadsides such as Macquarie Nature Reserve, Diggers Camp and Sandon Rds in Yuraygir National Park and as part of ongoing bush regeneration programs such as in Coffs Coast RP
- Support for programs involving community groups
- Programs around visitor areas
- Programs when a window of opportunity for control becomes available,for example implementing ground or aerial spraying programs within 12 months of a bushfire as has occurred south of the Wooli River after the 2009 fire.

Importantly where bitou bush occurs as part of a multi species weed infestation or other weeds are likely to invade post bitou bush control, then control of these other species is required.

Control

Bitou bush is controlled using an integrated approach. A number of different techniques are utilised including physical removal, cut & paint, herbicide treatment from backpack, vehicle and helicopter. Two biocontrol agents, Tip Moth (*Comostolopsis germana*) and Seed Fly (*Mesoclanis polana*) have also effectively established in all coastal reserves.

Monitoring

Bitou bush density and distribution mapping was undertaken in 2000 and 2007 for all coastal reserves.Monitoring transects and photopoints have been established in selected areas of various reserves. Some data dates back to the mid 1990s with a variety of methods used The Bitou Bush Monitoring Manual released in 2009 has facilitated standardised monitoring that has been a requirement of TAP site programs and externally funded programs In recent years Spatial records of bitou bush control programs are maintained on ArcGIS.and program effort will be recorded through the AMS. It is a project within the region to collate existing data and provide clear direction for future monitoring.

Blackberry *(Rubus fruticosus* aggregate*)* for North Coast Region

Distribution and abundance There are 26 known introduced *Rubus* species in Australia. Sixteen of these are from the *R. fruticosus* agg. (European blackberry). The other 10 are classed as other introduced weedy *Rubus* species and originate from either North America or Asia. (ref Blackberry Control Manual) *Rubus anglocandicans* is the main species within the region.

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

Within North Coast Region substantial blackberry infestations occur in Guy Fawkes River NP, New England NP, Cathedral Rock NP, Chaelundi NP and Nymboi-Binderay NP. Isolated infestations occur in all other reserves on the Dorrigo Plateau, in Wiili Willi NP, Werrikimbe NP the Carrai Plateau as well as Hat Head NP.

Impacts

Blackberry is a *Weed of National Significance* because of its invasiveness, potential for spread, and economic and environmental impacts. It is listed as a Class 4 weed under the *Noxious Weeds Act* throughout most of NSW. It is a sprawling perennial shrub that has long thorn-covered stems (canes) that can form large thickets which exclude light from the soil surface. Thickets can grow to several metres high and seriously impede regeneration of native flora species through competition for moisture, soil nutrients and light. Large, dense infestations can restrict access to watercourses by native fauna and park users.

Blackberry can provide significant harbour for rabbits, foxes, feral pigs and other pest animal species.

Priorities for control

Blackberry has been a high priority for control on reserves within elevated parts of the North Coast Region for many years. Major control programs have occurred in the Guy Fawkes River NP, Guy Fawkes River NR, Chaelundi NP, New England NP and Cathedral Rock NP. Priorities for control include:

- New or emerging infestations, or where the current distribution is limited such as Willi Willi NP and The Castles NR;
- Areas where high conservation values are threatened;
- Areas where public access to significant natural features is restricted;

Previously treated areas that require adequate follow-up control to prevent reinfestation.

Control

- Update distribution maps of blackberry on DECC (PWD) estate;
- Reduce distribution and potential to spread by treatment with herbicide;
- Carry out follow-up treatment as required for a minimum of 10 years or until there is no further regrowth;

Trial bio-control agents to determine effectiveness as a control measure.

Monitoring

- Establish photo-points to monitor re-establishment;
- General mapping of blackberry distribution and abundance in key locations such as Guy Fawkes River NP to note changes in distribution and density and to ensure all infestations are treated two out of three years;
- Monitor the quantity of herbicide used at each location, as the program proceeds.

Lantana *(Lantana camara)* for North Coast Region

Distribution and abundance

Lantana infests over 4 million hectares east of the Great Dividing Range from Eden in the South to Cape York Peninsula in the north, with isolated infestations found elsewhere in Australia. Although favouring warm humid environments, it is able to survive long droughts and frost by temporarily "shutting down", losing its leaves before re-shooting from the base following rainfall.

Lantana is the most common weed in the North Coast Region and is present to varying degrees in all reserves below 800m above sea level. Lantana favours disturbance and hence is particularly common in previously logged or cleared areas and along drainage lines and roadsides. It is a significant factor in many Bell Miner associated dieback areas.

Heavy lantana infestations occur in parts of Bongil Bongil NP, Dorrigo NP, Bellinger River NP, New England NP, Chaelundi NP, Bindarri NP, Yuraygir NP, Sherwood NR, Valla NR, Ngambaa NR, Yarriabini NP, Ramornie NP, Kumbatine NP/SCA, Willi Willi NP, Boonanghi NR Queens Lake NR/SCA, Middle Brother NP, Dooragan NP, Bago Bluff NP, Willi Willi Caves NR, Rawdon Creek NR, Yessabah NR, parts of Crowdy Bay NP and Hat Head NP. and the Bollanolla group of reserves. A successful control program has significantly reduced lantana infestations in Guy Fawkes River NP while other successful programs have been implemented in Macquarie NR, Sea Acres NR, Clybucca HS, Susan Island NR and parts of Yuraygir NP.

Impacts

Lantana readily invades forest edges, coastal woodlands, riparian zones, disturbed rainforest and open eucalypt woodland; particularly following soil or vegetation disturbance. Its dense thickets exclude native plant species through smothering and allelopathic effects. It can dramatically alter forest structure and fauna habitat, and restrict the movement of native fauna. Lantana thickets can increase the intensity of wildfires in some conditions (van Oosterhout 2004).

Lantana is listed as one of 20 Weeds of National Significance, a Key Threatening Process on the NSW *Threatened Species Conservation* Act and a declared noxious weed throughout Australia.

Priorities for control

- Endangered ecological communities Themeda grassland on headlands, littoral rainforest, subtropical floodplain forest, lowland subtropical rainforest on floodplain and swamp sclerophyll forest.
- Where threatened species are at risk
- Gondwana Rainforests and Yessabah Dry Rainforest
- As part of bush regeneration projects where a number of weeds are being targeted

Control

Integrated control techniques are required, where a range of techniques are used in combination, depending on the individual situation. Specific techniques include foliar spraying with herbicide (by back pack, quad bike, tractor-mounted quick spray unit or by splatter gun), cut-and-paint, hand removal and release of biological control agents. Mechanical techniques can be effective at controlling lantana and encouraging native regeneration, however, great care must be taken to minimise impacts on existing native vegetation, and significant follow-up control is required due to increased soil disturbance.

Effective herbicide or biological control is made more difficult by the plant's habit of temporarily "shutting down" during dry periods or after frost. Effective herbicide applications require the plant to be actively growing.

Monitoring

Programs focused in EECs or adjacent to threatened species are monitored through mapping and in some cases photo points and / or transects. This is particularly the case where lantana is being controlled at Bitou Bush TAP sites.

Exotic grasses for North Coast Region

- Giant Parramatta Grass (*Sporobolus fertilis*)
- Hairy Panic (*Panicum maximum* var. *trichoglume*)
- Spiny Burrgrass (non native *Cenchrus* spp.)
- Pigeon Grasses (*Setaria* spp.)
- Kikuyu (*Pennisetum clandestinum*)
- Whisky Grass (*Andropogon virginicus*)
- Broad leafed paspalum (*Paspalum mandiocanum*)
- Coolatai Grass (*Hyparrhenia hirta*)
- Buffalo grass (*Stenotaphrum secundatum*)
- Molasses grass (*Melinis minutiflora*)
- African lovegrass (*Eragrostis curvula*),
- Pampass grass (*Cortaderia sellona*),
- Elephant Grass (*Arundo donax*
- Giant paspalum (*Paspalum urvillei*)
- Carpet grass (*Axonopus affinis*),

Distribution and abundance

Infestations of most exotic grass species occur along roads, tracks and trails and previously disturbed areas within many reserves of the North Coast Region. Giant Parramatta grass is present almost exclusively along roadsides, often growing in dense swards (e.g. Ramornie NP, Clybucca HS and Limeburners Creek NP). Large areas of Yuraygir NP were previously sown with the pasture species of pigeon grass and it still dominates much of the landscape. Kikuyu is present on headlands in Hat Head, Goolawah, Limeburners Creek and Yuraygir NPs, Moonee Beach NR and Coffs Coast RP.

Buffalo grass also occurs on many these headlands as well as in saltmarsh areas. Hairy panic out competes understorey species in Coffs Coast Regional Park, preventing natural rainforest regeneration. A large infestation of Whisky grass occurs west of Sandon in Yuraygir NP and in Crowdy Bay NP on roads, trails and sites previously disturbed by sand mining operations and also occurs along roadsides in other coastal reserves such as Hat Head and Yuraygir NPs.

Broad leafed paspalum and Coolatai grass are increasing problems in coastal reserves. Molasses grass is present in dense infestations in disturbed areas in Coffs Coast RP and Crowdy Bay NP, and scattered infestations in Yariabinni NP. In addition there are often localised but dense infestations of other grasses such as elephant grass (*Arundo donax*), Giant Paspalum (*Paspalum urvillei*) and Carpet Grass (*Axonopus affinus) and Pampas Grass* in other reserves.

Temperate climate grasses such as African lovegrass (*Eragrostis curvula*) occur along roadsides in various parks and reserves and around visitor areas in the southern part of the region, Serrated tussock (*Nasella trichotoma*) and Chilean needlegrass (*Nassella neesiana*) threaten reserves in elevated areas such as Guy Fawkes River NP, Cathedral Rock NP and New England NP.

Impacts

Exotic grasses are vigorous, persistent and invasive weeds in disturbed areas. Once established they can displace low vegetation and native grasses, and provide a seed source for dispersal by vehicular and pedestrian traffic. Pigeon grasses and kikuyu form dense mats, elevating fuel loads that place woody native species at risk in wildfire. Kikuyu inhibits seed germination and seedling establishment in all vegetation communities, with regenerating rainforest of particular concern.

On headlands in Moonee Beach NR, Kikuyu and Giant Paspalum control is undertaken as a recovery action for the endangered *Zieria prostrata* populations. Spiny burrgrasses and

kikuyu have interfered with the nesting success of ground-nesting seabirds in Muttonbird Island NR, in addition to spiny burrgrass being an irritant for animals and park visitors.

Broad leafed paspalum is becoming invasive, dominating ground cover layers in full sun to shade. Buffalo grass can carpet the ground in the saltmarsh/swamp oak and grassy headland EECs. Whisky grass is a threat to swamp sclerophyll forest and heaths/sedgleands. Coolatai grass has proven very invasive in open woodlands on the slopes and tablelands and is a threat to heath lands, especially the graminoid clay heaths which are a feature of Yuraygir National Park.

Priorities for Control

- Endangered ecological communities littoral rainforest and grassy headlands in Moonee Beach and Kattang NRs, Coffs Coast and Goolawah RPs and Arakoon, Hat Head, Goolawah, Limeburners Creek, Crowdy Bay and Yuraygir NPs
- Shorebird nesting habitat, Muttonbird Island and Solitary Islands Nature Reserves
- Isolated and new infestations in all reserves with emphasis on Coolatai Grass in Hat Head and Yuraygir NPs and Broad leafed paspalum in Yuraygir NP and Coffs Coast Regional Park
- Where control of grasses are required as part of a bush regeneration program

Control of large long standing infestations of whisky grass and pigeon grass in previously disturbed areas of Yuraygir NP is being addressed by the exclusion of fire as much as practical to allow for the recovery of native shrubland/forest to overshade and exclude the grasses. This is currently the only realistic control technique given the extent of infestations.

Control

Most grass infestations are treated with herbicide and / or hand removed depending on their location.

Monitoring

NPWS will continue to record and map all occurrences and treatments of exotic grasses. Treatments will be assessed for their effectiveness.

Exotic vines for North Coast Region

- Cats claw creeper (*Macfadyena unguis-cati*)
- Madeira vine (*Anredera cordifolia*)
- Morning glory species (*Ipomoea* spp.)
- Balloon vine (*Cardiospermum grandiflorum*)
- Dutchman's pipe (*Aristolochia elegans*)
- Moth vine (*Araujia sericifera*)
- Asparagus ferns (*Asparagus* spp.)
- Japanese honeysuckle (*Lonicera japonica*)
- Passionfruits (*Passiflora spp)*
- Mysore Thorn (*Caesalpinia decapetala*)
- Climbing Nightshade (*Solanum seaforthianum*)

Turkey Rhubarb (*Acetosa sagittata*)

Distribution and abundance

Vine weed infestations occur in all major catchments within the North Coast Region. As most vine weeds are readily spread by water movement, riparian zones are particularly threatened.

Cats claw creeper, madeira and balloon vines are widespread within the region, infesting extensive areas of most river systems, as well as many tributaries. Most infestations occur on other lands outside of the national parks estate. Ongoing control programs for cats claw are undertaken in Susan Island NR and Coramba NR. Elsewhere in the region it has an isolated occurrence and any infestations are a high priority for control. Cats claw creeper is declared a Class 4 noxious weed in Bellingen Shire.

Madeira and balloon vines are readily spread by water, especially floods. Infestations occur in Coffs Coast RP, Bellinger River NP, Macquarie NR, Sea Acres NR, Yarrahapinni Wetlands NP , Susan Island NR and an isolated infestation in Muttonbird Island NR. An eradication program for madeira vine and balloon vine is currently being implemented in Dorrigo NP.

Infestations of coastal morning glory (*Ipomoea cairica)* occur in all coastal reserves while species such as *Ipomoea purpurea* are a problems, near urban areas including Macquarie NR, Bongil Bongil NP and Coffs Coast RP. An infestation of moonflower (*Ipomoea alba*) on Susan Island NR and adjoining crown land is of concern.

Asparagus spp. are common garden escapes that readily invade many coastal reserves. Significant climbing asparagus (*A. plumosus*) infestations have been controlled in and Susan Island NR. Ground asparagus (*A. aethiopicus*) occurs in Coffs Coast RP, Susan Island NR, Yuraygir NP, Arakooon NP,Hat Head NP, Goolawah NP, Limeburners Creek NP. Sea Acres NR, Kattang NR and Macquarie NR. Dutchman's pipe occurs in Susan Island NR.

Japanese honeysuckle is a significant weed on the Dorrigo plateau and infestations occur in Nymboi-Binderay NP, Chaelundi NP, Dorrigo NP, Junuy Juluum NP, Muldiva NR and Deervale NR. Moth vine has an isolated occurrence in some coastal reserves.

Mysore thorn (also known as thorny poinciana) is a climbing shrub from Indonesia. It has a limited distribution in the region, with a major infestation that occurred in and around the Innes Ruins HS. 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.

Turkey rhubarb is a prolific seeder and is fortunately restricted to a few reserves including Susan Island, Macquarie and Woregore NRs. This plant grows up and through understorey vegetation and can be a major problem on sand dunes.

Impacts

Vine weeds have been ranked by the NSW North Coast Weeds Advisory Committee as having the most impact on biodiversity of all weeds species present in the region. Vine weeds are easily transported, grow quickly and many are capable of climbing to the top of trees and stripping branches due to their weight. This leads to mass germination of vine weeds and other weeds with the increased sunlight reaching the forest floor and hence the destruction of floristic and structural diversity and fauna habitat. Heavy infestations result in trees being transformed to poles, often falling down in future flood events.

Substantial *Asparagus* infestations often create impenetrable thickets of thorny vine between the ground and 4m in height. Morning glory commonly occurs in coastal heaths, woodlands and swamp forests where it outcompetes, smothers and displaces native species.

Mysore thorn is a vigorous growing thorny plant capable of climbing and engulfing native vegetation, fences, road signs, sheds, bridges and other infrastructure. It especially favours creek lines where it forms dense thickets restricting water flows, access and downstream movement of flood debris; leading to increased flood damage (NCWAC, 2004).

Mysore thorn severely impacts on biodiversity through restricting germination, reducing forest biomass through smothering, and severely restricting movement of native animals. The sharp barbs on its branches can also injure native wildlife and humans. The sprawling thickets provide habitat for foxes, cats and rabbits. Mysore thorn is known to have carcinogenic properties and therefore care needs to be taken when disposing of and/or burning plant material

Vine weeds reduce human access and can impact on physical infrastructure such as fencelines and picnic facilities.

Priorities for control

- Endangered ecological communities lowland subtropical rainforest on floodplain, coastal floodplain forest, littoral rainforest, Themeda grassland on headlands and swamp forest.
- Near threatened species and known threatened species habitat including flying fox camps
- New and isolated infestations
- Bush regeneration programs targeting the most upstream infestations
- Maintenance of existing long-term control programs (eg Mysore Thorn), particularly following a window of opportunity such as after flood events

Control

The first priority for control in most vine weed infestations is to control the vine in the upper canopy. This is generally achieved through cutting and painting or scraping and painting, depending on the species, with herbicide. For madeira vine and balloon vine infestations aerial tubers / seed pods should be bagged and composted.

Follow up control generally involves foliar spraying seedlings and regrowth or hand removal of isolated plants.

In heavy *Asparagus* infestations there may be a need for physically clearing away stems tangled in trees before foliar spraying the remaining plants with herbicide. Light infestations can be controlled through crowning.

Monitoring

Vine weed infestations need to be controlled at least three times per year to ensure native regeneration is not adversely affected, and for madeira / balloon vine, that tubers and seed pods are not produced within that time. Isolated infestations are controlled immediately where possible, however it is important that their location is mapped to ensure adequate follow up control occurs.

Monitoring the effectiveness of key vine weed programs is undertaken through mapping the size and density of infestations, and establishing photo points. In some locations, quadrats are used to record the number and diversity of native and introduced plants.

Glory lily (*Gloriosa superba*) for North Coast Region

Distribution

Glory lily occurs in dunal areas and headlands with highest densities found in disturbed areas and/or where bitou bush control has been undertaken. Major infestations occur in Bongil Bongil NP, with moderate infestations in, Yuraygir NP and Arakoon NPPark and minor infestations in. Hat Head NP, Jagun NR and Coffs Coast RP.

Impacts

Glory lily is an aggressive perennial scrambler or climber that spreads by seed and vegetative means. It is suspected of heavy competition for water and nutrients, and contains harmful alkaloids that can cause fatal poisoning of mammals, including humans. It invades coastal plant communities from the incipient foredune to littoral rainforest.

Priorities for Control

- Endangered ecological communities littoral rainforest and grassy headlands in Coffs Coast Regional Park, Bongil Bongil NP, Yuraygir NP, Arakoon NP and Hat Head NP
- Isolated and new infestations in coastal reserves
- Maintain existing successful long term program in central Yuraygir National Park around Sandon and Bare Point-Wilsons Headland Bitou Bush TAP sites and in Coffs Coast Regional Park
- Where populations are likely to increase in response to other weed control.

Control

Thorough manual control of isolated plants with few stems is the most effective control option but is of limited practicality for any larger infestations. Herbicide application has shown variable success with the most effective option currently a mixture of glyphosate and metsulfuron methyl (used in accordance with Permit 9907) and applied early in the growing season with a follow up treatment late summer/early autumn.

A problem with herbicide application is the potential for off target damage, particularly in heavy infestations, and careful application is needed. Control trials (commenced in 2007) comparing a range of different herbicide treatments are continuing in Bongil Bongil NP.

Monitoring

Existing Infestations are treated biannually. New infestations are recorded and treated within that growing season.

Groundsel bush (*Baccharis halimifolia*) for North Coast Region

Distribution and abundance

Groundsel bush occurs in many reserves in the North Coast Region, generally on poorly drained soils or adjacent to estuarine areas, watercourses, coastal wetlands and swamp forest areas. Major infestations are found on former farmland in Yuraygir National Park in the Brooms Head and Station Creek areas, in former farmland in Clybucca Historic Site and Yarrahapinni Wetlands National Park and a moderate infestation in Moonee Beach NR.

Impacts

Groundsel bush is an aggressive invader of disturbed areas and readily invades and proliferates in undisturbed low-lying areas. It has a rapid growth rate and produces vast quantities of windborne seed, which germinates readily. It successfully out-competes and shades native species, prohibiting natural regeneration, and often forms dense thickets that grossly alter the structure and floristic composition of native plant communities (including some SEPP 14 wetlands). Groundsel bush is a Declared Class 3 weed under the *Noxious Weeds Act 1993* throughout the LGAs in North Coast Region. Groundsel bush can readily invade farmland, thereby imposing additional costs for farm management and is toxic to horses.

Priorities for control

- Continue and expand control programs in the endangered ecological communities; coastal saltmarsh, swamp oak floodplain forest, sub tropical coastal floodplain forest and swamp sclerophyll forest. These occur in Yarrahapinni Wetlands NP, Yuraygir NP, Moonee Beach NR, Bongil Bongil NP (including habitat of *Alexfloydia repens)* and Clybucca HS.
- Isolated and new occurrences
- Infestations near neighbouring properties
- Large infestations with existing programs where ongoing effort is required to maintain previous benefits.

Control

Herbicide control programs involving aerial and vehicle based spraying and cut stump have been utilised extensively within Yuraygir NP and Moonee Beach NR since the mid 1990s. Infestations have either been eradicated or reduced significantly where follow up treatments have occurred. More recently control programs in Yarrahapinni Wetlands NP and Clybucca HS are showing good results. Biological control agents such as the gall fly and stem borer are present throughout the area but generally only have minor impacts at the population level.

Monitoring

NPWS will continue to record and map all occurrences and treatments of groundsel bush.

Herbaceous weeds for North Coast Region

- Mistflower (*Ageratina riparia*)
- Crofton weed (*Ageratina adenophora*)
- Wandering Jew (*Tradescantia fluminensis*)
- Coral berry (*Rivinia humilis*)
- Formosa lily (*Lilium formosanum*)
- Painted spurge (*Euphorbia cyathophora*)
- Mother-of-millions (*Bryophyllum delagoense*)
- Noogoora burr (*Xanthium occidentale*
- St Johns wort (*Hypericum perforatum*),
- Spear thistle (*Cirsium vulgare)*
- Nodding thistle (*Carduus nutans*),,
- Silver-leaf desmodium (*Desmodium uncinatum*)
- Pennywort (*Hydrocotyle bonariensis)*

Distribution and abundance

All of the herbaceous weeds listed as a high priority for control with the exception of silver-leaf desmodium have been deliberately introduced to Australia as ornamental garden plants. They produce large numbers of bird or wind-dispersed seeds and grow vigorously in the warm humid environment of eastern Australia. At a landscape level, most of the herbaceous weeds listed above are beyond control, however important control programs are undertaken in specific locations or as part of programs focused on a number of weeds due to their significant adverse environmental impacts.

Herbaceous weeds are widespread in disturbed areas of the North Coast Region, especially in riparian zones, areas previously cleared and adjacent to urban areas.

Mistflower is a widespread weed in moister areas of many reserves in the North Coast Region, preferring disturbed areas in damp gully lines such as Dunggir NP, Boorganna NR, Banyabba NR and shingle banks of major waterways in New England NP, Dorrigo NP, Bellinger River NP and Juugawaarri NR.

Crofton weed commonly occurs on well-drained soils where rainfall exceeds 1200mm/year and frosts are rare. It has an isolated distribution in reserves with disturbed areas along roadsides.

Wandering Jew and Coral Berry occur in most reserves in the Region that support rainforest and moister forest types, particularly following disturbance.

Formosa lily and painted spurge are generally limited to coastal reserves, particularly adjacent to villages and urban areas, access tracks and visitor areas though their prevalence has been increasing. Silver-leaf desmodium is an escaped pasture plant and is particularly a problem in disturbed moist hinterland areas adjacent to roads and farmland.

Pennywort is widespread on sand dunes and also occasionally in swamp oak and swamp sclerophyll forests adjacent to lower reaches of coastal waterbodies.

Impacts

Heavy herbaceous weed infestations can totally cover the forest floor and exclude all native regeneration from an area. Mistflower, wandering jew and coral berry thrive in shady rainforest and moist forest areas, forming dense infestations that smother groundcover and understorey species and inhibit seed germination and regeneration. Mistflower, wandering jew and coral berry out-compete native rock orchids, riparian and rainforest species. Mistflower and coral berry produce large amounts of easily dispersed seed. Wandering jew spreads by vegetative means. Crofton weed produces large quantities of wind and water borne seed and is toxic to stock. Silver-leaf desmodium infestations can quickly smother native groundcovers, shrubs and regenerating trees and is easily spread by sticky seed pods.

Before major bush regeneration works commenced in Coramba NR in the late 1990s, the forest floor was almost completely covered with a severe wandering jew infestation reaching heights of up to 80-100cm. The infestation had virtually stopped all native regeneration and restricted native fauna and human access in the reserve.

Pennywort can reach high densities in seasonally inundated coastal habitats, outcompeting and replacing native groundcover vegetation.

Priorities for control

- Maintain and expand where possible existing successful long term control programs in Coramba NR, New England NP, Coffs Coast RP, Yuraygir NP and Arakoon NP
- Protection of important assets such as the endangered ecological community lowland subtropical rainforest on floodplain, and threatened species habitat
- High profile locations around key visitor use areas and cultural heritage precincts, for example Trial Bay Gaol
- Where control of herbaceous weeds are required as part of a bush regeneration program

Control

Control is firstly targeted towards protecting significant plants and habitats before expanding to adjoining areas. Although the main control technique used is foliar spraying with glyphosate, great care is required to ensure that native plants and fauna such as threatened frog species are not adversely affected. In moist creek and riparian environments, hand removal techniques such as rolling back of wandering jew and removing from the site can be very effective and not too labour intensive for light and scattered infestations. Where mistflower is removed by hand, it must be securely hung up to ensure that it does not re-grow. Where foliar spraying is required, herbaceous weeds should first be manually removed from around native species.

The recent biological control release of the white smut fungus *Entyloma ageratinae* in the region is showing great promise with large-scale death of plants, including in more remote locations, in reserves such as New England NP, Dorrigo NP and Bongil Bongil NP.

Monitoring

Monitoring programs have been established in key herbaceous weed control sites and where herbaceous weeds are being controlled as part of larger bush regeneration programs such as in Coramba NR, New England NP. Monitoring usually consists of photo points and either transects or quadrats through the affected area and adjoining areas to compare native and weed species distribution and abundance as well as rates of recruitment.

Pines - Slash Pine (*Pinus elliottii*) and Radiata Pine (*P. radiata*) and other exotic conifers for North Coast Region

Distribution

Major pine infestations occur as dense stands and individual wildlings that have spread from plantations and other plantings in or adjacent to reserves, e.g. southern Yuraygir NP, Bongil Bongil NP, Maria NP, Crowdy Bay NP (all Slash Pine) and Cascade NP (Radiata pine). Cottan-Bimbang NP, The Cells SCA, Werrikimbe NP/SCA (Some parks include small trial plantations, including a plot in southern Yuraygir NP also containing Queensland kauri pine (*Agathis robusta*) and cypress pine (*Cupressus* sp.), in addition to slash and radiata pines. The most significant of these is the former Banda Banda arboretum in Willi Willi NP, planted in 1964 seven different species of conifers were planted to investigate how they grew in high altitude climates. These plantings are considered to have historic significance.

Impacts

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

Priorities for control

- Control of new and isolated infestations is a high priority in all reserves.
- The ongoing program in southern Yuraygir National Park to contain and reduce the pine population will continue.
- In northern Bongil Bongil National Park, ongoing suppressive control of isolated pines will continue.
- At Banda Banda, monitoring of exotic conifer seedling spread and their control if necessary. Other actions are identified in the Willi Will National Park plan of management.

Control

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

Monitoring

New infestations are recorded and controlled where feasible.

Woody weeds for North Coast Region

- Narrow-leaved privet (*Ligustrum sinense*)
- Large-leaved privet (*Ligustrum lucidum*)
- Camphor laurel (*Cinnamomum camphora*)
- Winter senna (*Senna pendula* var*. glabrata*)
- Ochna / Mickey mouse plant (*Ochna serrulata*)
- Coastal tea-tree (*Leptospermum laevigatum*-north of Nambucca)
- Willow wattle (*Acacia saligna*)
- Mulberry (*Morus alba* and *Morus nigra*)
- Smooth senna (*Senna* X *floribunda*)
- Umbrella tree (*Schefflera actinophylla*)
- Polygala (*Polygala myrtifolia*),

Distribution and abundance

Woody weeds are widespread in many urban, private forest and agricultural environments within the North Coast Region. Most woody weed infestations on National Park estate have originated from adjoining urban plantings, abandoned habitation, or from major disturbances during previous land uses, e.g sand mining or clearing.

Privets are widespread on the Dorrigo and Comboyne Plateaux and scattered throughout moister hinterland areas. Within the NPWS estate they are common in many disturbed areas, riparian zones and along roadsides in Dorrigo NP, Cascade NP, Junuy Juluum NP, Nymboi-Binderay NP, Muldiva NR, Comboyne NP and Deervale NR. Elsewhere in the region they occur in Bellinger River NP, Bindarri NP, Coffs Coast RP, Coramba NR, Susan Island NR, Macquarie NR, Bridal Veil Falls NR/SCA and Boorganna NR.

Camphor laurel mostly occurs as isolated infestations in reserves located on floodplains or near urban centres. Winter senna is common in coastal areas such as Coffs Coast RP, Moonee Beach NR, Yuraygir NP, Arakoon NP, Hat Head NP, Goolawah NP, Sea Acres NR, Macquarie NR, Crowdy Bay NP, Queens Lake NR/SCA, . Smooth senna occurs sporadically in disturbed moist forest areas of many reserves. Scattered ochna and umbrella tree infestations occur in coastal parks especially close to urban areas.

Dense stands of coastal tea-tree and willow wattle have resulted from deliberate introductions during post-sandmining rehabilitation efforts in Yuraygir NP, Bongil Bongil NP, and Moonee Beach NR. A dense mulberry stand occurs on Susan Island NR. Polygala is an increasing problem in coastal reserves south of the Macleay River.

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. Examples include privets in Coramba NR, Dorrigo NP, Comboyne NP and Bindarri NP, mulberry in Susan Island NR, ochna, willow wattle and coastal tea-tree in Yuraygir NP

Most high priority woody weeds are capable of growing in semi-shade, are fast growing and are prolific seeders. Some have long-lived seed. Dense infestations alter the structural and floristic characteristics of native vegetation, displacing native canopy species, dominating the understorey and reducing the regeneration of native species. As an example, camphor laurel-dominated sites produce large quantities of fruit for three months of the year compared to a healthy diverse subtropical rainforest that may be dominated by over 100 individual species that fruit throughout the year.

Priorities for control

- High conservation value locations such as Endangered Ecological Communities and adjacent to threatened species and their habitats;
- New and isolated infestations;

- Existing successful long-term woody weed control programs;
- Bush regeneration programs focused on a number of weeds.

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 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

Mapping of woody weeds has been undertaken as part of specific reserve-based weed control strategies such as Coffs Coast RP and Moonee Beach Coastal Weeds Strategy, Junuy Juluum Weed Control Strategy and Bindarri National Park Pest Control Strategy. For other locations monitoring in the form of photo points, transects and / or quadrats is undertaken occasionally.

Aquatic weeds for North Coast Region

- water lettuce (*Pistia stratiotes*)
- salvinia (*Salvinia molesta*)
- cabomba (*Cabomba caroliniana*)
- parrots feather (*Myriophyllum aquaticum*)
- water hyacinth (*Eichhornia crassipes*)
- sharp rush (*Juncus acutus*).

Distribution and abundance

Water lettuce – occurs together with salvinia in a relic sandmining pond in Crowdy Bay NP.

Salvinia – there is a heavy infestation in Harrington Lagoon, and also in the relic sandmining pond in Crowdy Bay NP; a heavy infestation once occurred in the Swanpool wetland within Hat Head NP; a heavy infestation in Goolawah NP, a moderate infestation in and around Lake Innes NR and a small infestation is recorded in a dam within Rawdon Creek NR.. This weed also occurs at several off-park locations within the major floodplain catchments within NCR.

Cabomba – heavy infestation in stormwater drain (Cabomba Drain) in Lake Innes NR. Additional infestations occur in off-park stormwater drains and creek lines which flow into Lake Innes NR.

Parrots feather – occurs together with cabomba in Cabomba Drain in Lake Innes NR and is also present in off-park stormwater drains and creek lines which flow into Lake Innes NR.

Water hyacinth – occurs as a medium to heavy infestation in the Swanpool within Hat Head NP and as a heavy infestation in Goolawah Lagoon in Goolawah NP. It also occurs at several off-park locations within the major floodplains of the Hastings, Macleay and Clarence catchments.

Sharp rush – infestations are recorded in the lower Macleay posing a threat to Yarrahappini Wetlands NP and Fishermans Bend NR.

Impacts

Water lettuce can produce abundant growth, expand rapidly and form obstructive mats. These large dense floating mats can have negative impacts on native aquatic plants and animals. They can interfere with irrigation, boating and water sport activities. Thick mats of water lettuce are also known to harbour mosquitoes. Water lettuce is declared Class 1 under the *Noxious Weeds Act 1993* in all LGAs in North Coast Region.

Salvinia disrupts aquatic ecosystems, seriously affecting native animals and plant life; decreases the quality of water by causing odours, accumulation of organic matter and stagnation of streams; degrades the aesthetic values of waterways; reduces or prevents the use of waterways for recreation and transport; and interferes with the functioning of river control structures, especially during flooding (DPI, 2006). Salvinia is declared Class 3 under the *Noxious Weeds Act 1993* in all LGAs in North Coast Region. Salvinia is listed as a Weed of National Significance in Australia.

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 declared Class 5 under the *Noxious Weeds Act 1993* in all LGAs in NCR. Cabomba is listed as a Weed of National Significance in Australia.

Parrots feather forms dense stands and is capable of totally choking water ways, excluding all other flora and fauna.

Water hyacinth can form a dense, impenetrable mat over the water surface. Specific damage includes: destroying natural wetlands; eliminating native aquatic plants; reduced infiltration of sunlight; changing the temperature, pH and oxygen levels of water; reducing gas exchange at the water surface; increasing water loss through transpiration; altering the habitats of aquatic plants and animals; reducing aesthetic values of waterways; and reducing water quality (DPI, 2005). Water hyacinth is declared Class 3 under the *Noxious Weeds Act 1993* in all LGAs in NCR except Clarence Valley where it is a Class 4.

Sharp rush displaces native rushes and sedges. It can rapidly spread through wetlands, river systems and creeks. Recreational quality of habitat is greatly reduced due to sharply pointed leaves and stems. *Juncus acutus* is closely related to the native *J. kraussii* and there documented cases that where the two are growing together that they have hybridised. The hybrid is potentially more dangerous than the straight *J. acutus*.

Priorities for control

- Water lettuce - relic sandmining pond in Crowdy Bay NP.
- Salvinia - Harrington Lagoon and the relic sandmining pond in Crowdy Bay NP; Swanpool wetland in Hat Head NP; Goolawah Lagoon in Goolawah NP and dam in Rawdon Creek NR.
- Cabomba - Cabomba Drain in Lake Innes NR.
- Parrots feather - Cabomba Drain in Lake Innes NR.
- Water hyacinth - Swanpool wetland in Hat Head NP Goolawah Lagoon in Goolawah NP.

Sharp rush –Monitoring for presence in lower Macleay Reserves.

Control

Aquatic weed control is problematic due to rapid growth of aquatic weeds and the impact dead and decaying material can have on water qualityAs new biological control agents become available for aquatic weeds these will be incorporated into the integrated aquatic weed control program.

Water lettuce – physical removal is effective for small infestations. Water lettuce plants cannot survive for long out of the water and can be removed by either raking or being pulled to the bank with an encircling rope. Once removed, plants must be allowed to dry out and break down. It is important to make sure that all plants removed are placed above the flood line. If possible, place on plastic to prevent them from taking root in the mud. Water weed harvesting craft may be suitable for larger infestations although these can be quite expensive. Herbicides may be necessary to control large infestations of water lettuce. Currently, biological control is not considered an effective method for this weed. However, the weevil (*Neohydrnomu pulchellus*) has been successful in clearing a dam of water lettuce in Queensland within seven months of its release and has significantly reduced other infestations near Brisbane. In the longer term, biological control may be considered appropriate as part of an integrated control approach following further research into combatants suited to this climate.

Salvinia – successful management of salvinia relies on early detection, action and implementation of an integrated control program. Varying infestations may require a different method or a combination of biological, mechanical or herbicide control techniques (DPI, 2006a). Detailed information on integrated control is available in the NSW DPI's 'Salvinia Control Manual' (DPI, 2006b). An ant-sized weevil (*Cyrtobagous salviniae*) has been released in the Swanpool wetland in Hat Head NP and Goolawah Lagoon.

Cabomba – once established it is extremely difficult to control. Mechanical removal of small infestations can be attempted, if practical. All fragments of the weed must be removed and disposed of carefully. Excavators may be used to remove larger infestations. Draining or "draw down" of a water body can also be effective. There are no herbicides registered for cabomba control in NSW.

Parrots feather – physical removal of isolated plants, removing all plant material. Dry out all material on the ground in the sun. Never dispose of any parrots feather in ditches, creeks etc.

Water hyacinth – integrated control (mechanical, biological and chemical). Physical removal of isolated seedlings/plants.

Sharp rush – mechanical removal in areas already disturbed or invaded with weeds. Physical removal of isolated infestations. Due to hybridisation, successful programs are potentially limited at this stage.

Monitoring

NPWS will continue to record and map all aquatic weed infestations in NCR. The effectiveness of control techniques will be monitored together with various water quality parameters. NPWS will liaise with relevant councils prior to undertaking aquatic weed control programs.

Plant pathogen (*Phytophthora cinnamomi)* for North Coast Region

Information from Northern Rivers Region RPMS and extracted from the NSW Statement of Intent 1: Infection of native plants by *Phytophthora cinnamomi*
http://www.environment.nsw.gov.au/resources/threatenedspecies/08119soipc.pdf

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 infested 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 forest timber resources. 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.

Impacts

Phytophthora cinnamomi is the most widespread and destructive of the 32 *Phytophthora* species that occur in Australia and is listed as key threatening process under both State and Federal legislation. Susceptible species display a range of symptoms; some are killed, some are damaged but endure, and some show no apparent symptoms. In some circumstances, *P. cinnamomi* may contribute to plant death where there are other stresses present (e.g. waterlogging, drought, and wildfire). Infection of native plants by *Phytophthora cinnamomi* has been identified as a key threatening process for a number of threatened species resulting in a national threat abatement plan for Phytophthora was prepared in 2001 and a Statement of Intent was prepared for NSW in 2008.

Management Objectives

Prevent further species or ecological communities from becoming threatened

Control Priorities

- Identify presence of Phytophthora by conducting surveys and sampling areas of poor tree health or dieback
- Identify and implement appropriate containment and hygiene protocols for affected areas.

Control Techniques

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

Monitoring

- Soil sampling in key locations to determine movement
- Monitoring of vegetation to in key locations to determine impacts on vegetation and key species

Myrtle rust (*Uredo rangelii)* for North Coast Region

Distribution and abundance

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

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

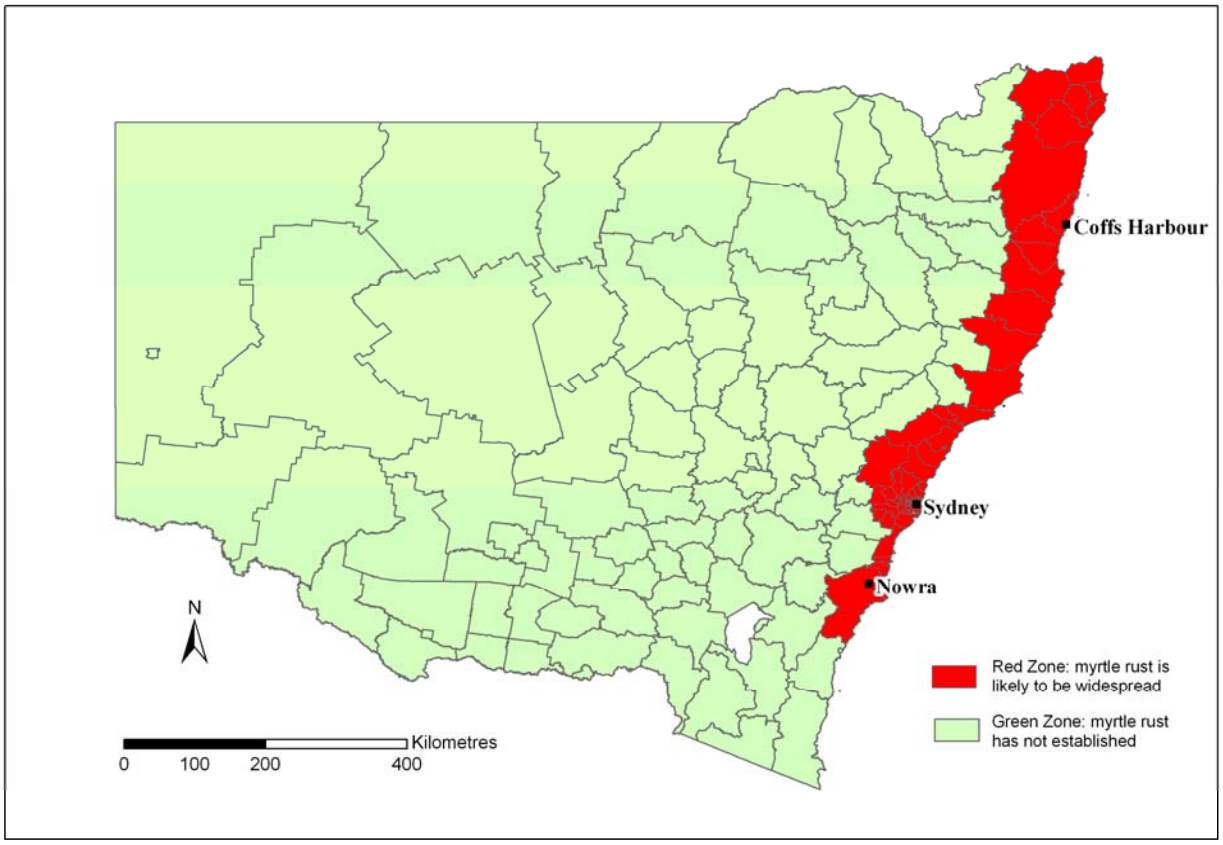

Figure 1: Approximate distribution of myrtle rust *Uredo rangelii* as of 24/01/2011. The red zone is comprised of local government areas where rust has been detected and is likely to be widespread. The green zone is comprised of local government areas where rust has not established. Data from NSW Department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

Impacts

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

The likely impacts of myrtle rust on biodiversity in Australia are unknown. Like *P. psidii*,

infection with myrtle rust may cause significant mortality among younger plants and hence reduce recruitment into adult populations. This may contribute to the decline and extinction of species, which is of immediate concern for those species already at high risk, i.e. threatened species. Reduced recruitment may also have severe impacts on the structure and function of the many natural ecosystems that depend on Myrtaceae. As at 28 March 2011, myrtle rust had been detected in 68 species of Myrtaceae, spanning 27 genera. Severe infection had been observed in relatively few species (most notably scrub turpentine *Rhodamnia rubescens* and native guava *Rhodomyrtus psidoides*) 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.

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

Priorities for Control

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

The objectives of the Plan are to:

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

Control

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

NCR will be implementing this plan as far as practical during 2012.

Monitoring

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

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

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

Distribution and abundance

Bell Miner Associated Dieback (BMAD) is found in a number of eucalypt forest types between Victoria and southern Queensland. The current spatial distribution of BMAD throughout NSW is not known in detail. Significant areas of forests within NCR are at risk or have already been affected by BMAD. Areas of BMAD are known to occur in Kumbatine National Park, Nymboida National Park, the Babadaga reserves and New England National Park . There are areas of adjoining State Forest and private forested lands that are vulnerable or affected in the Region.

Impacts

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

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

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

Priorities for control

Control priorities are currently limited to identifying the presence of BMAD and assessing the impact of BMAD at particular sites. Where the impact is significant, or could potentially become significant, site management plans will be prepared.

Control

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

Monitoring

Monitoring of the location size of BMAD affected areas, and the outcomes of management actions on ecosystems will continue and will be used to assist with adapting future

management. Communities at risk of BMAD and new reports of BMAD will be assessed and mapped. The BMAD Working Group will provide advice and direction for future management.

Amphibian chytrid fungus - *Batrachochytrium dendrobatidis* for North Coast Region

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

Distribution and abundance

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

Impacts

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

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

Management Objectives

- Prevent the further spread of the pathogen into other uninfected areas and frog populations in NSW;
- Prevent other species from becoming threatened;

Improve understanding of the disease through monitoring key threatened frog populations

Control Priorities

- Containment ;
- Manage the threat of chytridiomycosis posed to threatened species and populations of frogs at key locations;

Undertake research and monitoring of the pathogen to further investigate effective management approaches**.**

Control Techniques

- Promote and implement effective hygiene protocols – copy available at: http://www.environment.nsw.gov.au/resources/nature/hyprfrog.pdf

Threat abatement for key threatened species or populations including habitat modification, captive breeding programs, translocations and treatment of individuals

Monitoring

- Monitoring key threatened frog populations to investigate transmission and dispersal of *B. dendrobatidis* to improve understanding of the disease;

- Support research into understanding species resistance to *B. dendrobatidis,* both innate and acquired to assess evolutionary responses and potentially improve the success of re-introduction programs.

8. Pest distribution tables

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

● Denotes established widespread populations throughout a reserve

○ Denotes scattered populations throughout a reserve

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

# Denotes likely or predicted to occur

* Schedule 2 lands under the RLPB Wild Dog Pest Control Order

Dorrigo Plateau Area Pest Animals Distributions

	Red fox	Wild dog	Feral horse	Feral cat	Feral pig	Introduced Rodents	Feral deer	Feral Rabbit	Feral Fish	Feral goat
Baalijin NR*	#	#								
Bagul Waajaar NR	○	○		#						
Bellinger River NP	○	○		○		#	#			
Cascade NP*	#	○		●		#				
Cathedral Rock NP*	○	○		#	○					⊙
Chaelundi NP*	○	○		#						
Cunnawarra NP*	○	○		#						
Deervale NR	⊙			○						
Dorrigo NP*	○	⊙		○		○	#	⊙		
Guy Fawkes River NP/NR*	○	○	●	○	⊙	○	⊙	⊙		⊙
Junuy Juuluum NP	○	○		#						
Mount Hyland NR*	⊙	⊙		○	○	○	⊙			
Muldiva NR	⊙			#						
New England NP*	○	○		○		○	○	⊙	⊙	
Nymboi-Binderay NP*	○	○		#						

	Red fox	Wild dog	Feral horse	Feral cat	Feral pig	Introduced Rodents	Feral deer	Feral Rabbit	Feral Fish	Feral goat
Serpentine NR*	○	○		#	○					

Dorrigo Plateau Area Weed Distributions

•	Bitou bush	Blackberry	Groundsel bush	Glory lily	Exotic vines	Lantana	Pine species	Woody weeds	Herbaceous weeds	Exotic grasses
Baalijin NR						●			⊙	○
Bagul Waajaar NR		○			○			○	○	○
Bellinger River NP					⊙	●		⊙	⊙	○
Cascade NP		○	○		○		○	○	○	○
Cathedral Rock NP		○								○
Chaelundi NP		○				●				○
Cunnawarra NP		○				○	○			○
Deervale NR					○			○		○
Dorrigo NP					○	○		○	○	○
Guy Fawkes River NP		●				○				○
Guy Fawkes River NR		●								○
Guy Fawkes River SCA		○			●	○		○	○	○
Jobs Mountain NR						●				○
Junuy Juuluum NP		○			○			○		
Mount Hyland NR		○							○	○
Muldiva NR		⊙			○			○	⊙	
New England NP		⊙			⊙	○		⊙	○	○
Nymboi-Binderay NP		○			⊙	○	⊙	○	○	○
Serpentine NR		○								○

Clarence South Area Pest Animals Distributions

	Red fox	Wild dog	Feral horse	Feral cat	Cane toad	Feral pig	Introduced rodents	Feral deer	Feral goat
Byrnes Scrub NR*		○							
Chambigne NR	#	○							
Flaggy Creek NR									
Hortons Creek NR									
Koukandowie NR	○	○							
Nth Rock NR									
Nth Solitary Island NR									
NW Solitary Island NR									
Nymboi-Binderay National Park*	#	○		○					
Nymboida National Park*	○	○							
Ramornie National Park*	○	○							
Sherwood NR	○	○		○					
Susan Island NR	○						○		
Tallawudjah NR									
Yuraygir SCA	○	○	○			○			
Yuraygir National Park*	○	○	○	●	⊙	○			

Clarence South Weed distributions

	Bitou bush	Blackberry	Groundsel bush	Glory lily	Exotic vines	Lantana	Pine sp	Woody weeds	Herbaceous weeds	Exotic grasses
Byrnes Scrub NR						●				
Chambigne NR						○				○
Flaggy Creek NR						○			○	○
Hortons Creek NR						○				○
Koukandowie NR						○		○	○	○
Nth Rock NR									○	○
Nth Solitary Island NR					○				○	○
NW Solitary Island NR					○				○	○
Nymboi-Binderay NP		⊙				●		●	○	○
Nymboida NP						●		○		○
Ramornie NP						●				○
Sherwood NR			○			●			○	
Susan Island NR					●	○		●	●	○
Tallawudjah NR			○		○	○		○		○
Yuraygir SCA			○		○	○				
Yuraygir NP	●		●	●	○	○	●	●	●	●

Coffs Coast Area Pest Animal Distribution

	Red fox	Wild dog	Feral cat	Cane toad	Feral pig	Introduced rodent	Feral birds	Feral deer
Bindarri NP*	○	○	#			○		
Bollanolla NR	○	○	#					
Bongil Bongil NP*	○	○	○		○	#		
Bowraville NR	○	○	#					
Coffs Coast RP	○	○	○			○	⊙	
Coramba NR	⊙					#		
Dunggir NP*	○	○	○					⊙
Ganay NR	○	○	○					
Garby NR	○	○	○					
Gaagal Waanggaan (South Beach) NP	○	○	○					
Gumbaynngirr NR	○	○	○					
Jaaningga NR	○	○	○					
Jagun NR	○	○	○					
Juugawaarri NR	○	○	○					
Korora NR	○		○			#		
Moonee Beach NR	○		○			#		
Muttonbird Island NR	○					●		
Ngambaa NR*	○	○	○		#			
South Solitary Is NR						●		
Ulidarra NP	○	○	○					
Valla NR	○		○			#		
Yarriabini NP	○	○	○		⊙			
Nambucca AA								
Nunguu Miirral AA	○							

Coffs Coast Area weed distribution

	Bitou bush	Blackberry	Groundsel bush	Glory lily	Exotic vines	Lantana	Pine species	Woody weeds	Herbaceous weeds	Exotic grasses
Bindarri NP			⊙		⊙	○		○	○	○
Bollanolla NR						●		○	●	○
Bongil Bongil NP	○		○	○		○	○	○	○	●
Bowraville NR						●		○	○	○
Coffs Coast RP	●		⊙	⊙	○	○	⊙	●	●	●
Coramba NR					⊙			○		
Dunggir NP					○	○		○	○	○
Gaagal Wanggaan NP	●		○		○	○		○	○	○
Ganay NR						●				○
Garby NR			○							○
Gumbaynngirr NR						○			○	○
Gumbaynngirr SCA					⊙	○			○	○
Jaaningga NR			⊙		○	○		○	●	
Jagun NR	⊙		⊙	⊙	⊙	○		○	○	○
Juugawaarri NR			⊙			●			○	○
Kororo NR					⊙	○	○	⊙	○	○
Moonee Beach NR	○		○		⊙	⊙		⊙	⊙	○
Muttonbird Island NR	○				○	○			○	○
Ngambaa NR					○	○		⊙	○	○
Solitary Islands NR	○				○	○				
Ulidarra NP			⊙		⊙	○			⊙	⊙
Valla NR	⊙					○		⊙	⊙	○
Yarriabini NP	○		⊙			○		○	○	○

Nambucca AA			⊙			○				○
Nunguu Miirral AA						○			○	⊙

Hastings Area Pest Animal Distributions

	Fox	Wild Dog	Feral Cat	Wild Deer	Feral pig	Feral Cattle	Feral Goat	Feral Rabbit	Introduced rodents	Feral Birds	Cane Toad	Feral Fish	Feral Honeybees
Bago Bluff NP	●	○	●	#		⊙			#	#		#	#
Boorganna NR	○	○	○						#				
Bridal Veil Falls NR/SCA	⊙	⊙	#			#		#	#				#
Biriwal Bulga NP*	○	●		⊙		○			#				○
Comboyne NR	○	○	○						#				
Cottan-Bimbang NP*	○	○	○	⊙	#	#			#				#
Crowdy Bay NP	○	⊙	○	⊙	⊙			⊙	○	⊙		#	●
Dooragan NP	⊙	⊙	⊙	⊙			⊙	⊙	○	⊙		#	○
Innes Ruins HS	#			⊙	#			#	⊙				#
Jasper NR	○	⊙											
Kattang NR	●		●						⊙	⊙			○
Koorebang NR	○	⊙											
Lake Innes NR / SCA	○	○	○	○	⊙			⊙	○	⊙	⊙	⊙	○
Macquarie NR	○		○	⊙				⊙	●	⊙		⊙	#
Middle Brother NP	○	⊙	○	⊙					#			#	#
Mount Seaview NR	○	⊙											
Queens Lake NR / SCA	○	○	○	○			⊙	#	○	⊙		#	○
Rawdon Creek NR	○	⊙	○	#					○	⊙		#	●
Roto House HS									#	⊙			

	Fox	Wild Dog	Feral Cat	Wild Deer	Feral pig	Feral Cattle	Feral Goat	Feral Rabbit	Introduced rodents	Feral Birds	Cane Toad	Feral Fish	Feral Honeybees
Sea Acres NR	⊙		○	⊙					⊙	⊙			#
The Cells SCA	⊙	○	○	⊙					⊙				
Werrikimbe NP*	⊙	●	○	⊙	⊙	⊙	#	⊙	○				⊙
Woregore NR	⊙		⊙						●	⊙			⊙

Hastings Area Weed Distributions

	Bitou Bush	Blackberry	Lantana	Groundsel Bush	Winter Senna	Woody Weeds	Exotic Pine	Herbaceuos Weeds	Eoxtic Grasses	Exotic Vines	Aquatic Weeds
Bago Bluff National Park			●		#	#	#		○		○
Boorganna NR			⊙			#			#		#
Bridal Veil Falls NR/SCA			#		#	#			⊙	#	⊙
Biriwal Bulga National Park			○						⊙		⊙
Comboyne NR			#						#		#
Cottan-Bimbang National Park			⊙				⊙	⊙	⊙		⊙
Crowdy Bay National Park	●		●	⊙	⊙	⊙	⊙		●	#	●
Dooragan National Park	⊙		●		⊙	⊙			⊙	#	⊙
Innes Ruins HS	#		⊙			#		⊙	●		●
Jasper NR			●								
Kattang NR	●	⊙	⊙	⊙	⊙	⊙			○	⊙	○
Koorebang NR			●								

	Bitou Bush	Blackberry	Lantana	Groundsel Bush	Winter Senna	Woody Weeds	Exotic Pine	Herbaceuos Weeds	Eoxtic Grasses	Exotic Vines	Aquatic Weeds
Lake Innes NR / SCA	○		⊙	*	⊙	#		⊙	○	⊙	○
Macquarie NR	⊙		⊙		⊙	⊙		⊙	○	⊙	○
Middle Brother National Park	⊙		⊙		#	#		#	⊙		⊙
Mount Seaview NR			#						⊙		⊙
Queens Lake NR / SCA	⊙		●		⊙	⊙			⊙	#	⊙
Rawdon Creek NR	#	⊙	●						●	#	●
Roto House HS			⊙		⊙				⊙	#	⊙
Sea Acres NR	●	⊙	⊙		⊙	#		⊙	○	⊙	○
The Cells SCA			⊙				⊙	⊙	⊙		⊙
Werrikimbe National Park		#	⊙		⊙		⊙		⊙		⊙
Woregore NR	●		⊙		⊙	#			⊙	⊙	⊙

Macleay Area Pest Animal Distribution

	Fox	Wild Dog / Dingo	Feral Deer	Feral Cat	Feral pig	Feral Goat	Feral Rabbit	Introduced Rodents	Feral Birds	Feral Honeybees	Cane Toad	Feral Fish
Arakoon SCA	●	⊙		○				⊙		⊙		#
Boonanghi NR/SCA	○	⊙		⊙								
Carrai NP/SCA*	⊙	○	#	⊙	⊙							
Clybucca HS/AA	●	⊙	#	○			○	○		⊙		
Cooperabung Creek NR	●	⊙		○								

	Fox	Wild Dog / Dingo	Feral Deer	Feral Cat	Feral pig	Feral Goat	Feral Rabbit	Introduced Rodents	Feral Birds	Feral Honeybees	Cane Toad	Feral Fish
Fifes Knob NR	⊙	⊙	#									
Fishermans Bend NR/SCA	●	●		●			○	○	⊙	⊙		
Gads Sugarloaf NR	⊙	○	#	#								
Goolawah NP/RP	⊙	⊙	○	○	○		○	○	○	⊙		⊙
Hat Head NP	●	●	⊙	○				⊙		⊙		⊙
Kumbatine NP/SCA*	○	⊙		○	⊙			⊙				
Limeburners Creek NR*	●	⊙	⊙	○	○			⊙		⊙		⊙
Maria NP	●	○		○	⊙			⊙		#		
New England NP*	⊙	○	#	#	#							
Pee Dee NR	⊙	○	#	#								
Skillion NR	●	○		○			○		⊙	⊙		
The Castles NR*	⊙	○	#	#				#				
Willi Willi Caves NR	⊙	⊙		#			○			#		
Willi Willi NP*	○	⊙			○	#	⊙	#				
Yarrahapinni Wetlands NP	●	●	#	○								●
Yarravel NR	●	⊙	#	○			⊙		⊙	⊙		
Yessabah NR	●	#		○				⊙		⊙		

Macleay Area Weed Distributions

	Bitou Bush	Blackberry Lantana	Groundsel Bush	Glory Lily	Woody Weeds	Exotic Pine	HerbaceuosWeeds	Eoxtic Grasses	Exotic Vines	Aquatic Weeds

	Bitou Bush	Blackberry	Lantana	Groundsel Bush	Glory Lily	Woody Weeds	Exotic Pine	HerbaceuosWeeds	Eoxtic Grasses	Exotic Vines	Aquatic Weeds
Arakoon SCA	⊙		⊙		⊙	⊙			⊙		
Boonanghi NR/SCA			●						⊙		
Carrai NP/SCA			⊙			⊙			⊙		
Clybucca HS	⊙		●	●					⊙	⊙	
Cooperabung Creek NR			⊙			⊙			⊙		
Fifes Knob NR			⊙								
Fishermans Bend NR/SCA	⊙		⊙	⊙		⊙			⊙		
Gads Sugarloaf NR			●								
Goolawah NP	●		○			○		○	○		⊙
Goolawah RP	●		○			○		○	○		
Hat Head NP	●	⊙	⊙	⊙	⊙	⊙			⊙	⊙	⊙
Kumbatine NP/SCA			●	⊙		⊙			⊙		
Limeburners Creek NR	●		⊙			⊙			⊙		
Maria NP	⊙		○				⊙		⊙		
New England NP			●						⊙		
Pee Dee NR			⊙								
Skillion NR			●			○			⊙		
The Castles NR		⊙	⊙								
Willi Willi Caves NR			●								
Willi Willi NP		⊙	○			⊙	⊙		⊙		
Yarrahappinni NP/NR			●						⊙		
Yarravel NR			○			○			⊙		
Yessabah NR			●			⊙			⊙		

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