

## Northern Plains Region

# Draft Regional Pest Management Strategy

Part B: 2012-2015



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## Summary

The Northern Plains Region of the National Parks and Wildlife Service manages over 550 000 hectares of protected area reserve system in central north New South Wales. In partnership with the community, the Region manages a total of 76 reserves comprising National Parks, Nature Reserves, Aboriginal Areas and State Conservation Areas.

The reserve network with the Region includes a diversity of landscapes that support a number of threatened animals, plants and communities, important cultural heritage, wilderness areas and Ramsar wetlands. This suite of habitats enables a wide and varied range of pest species to occur. The known distribution within reserves is provided within this document.

The priorities for management of pest species across the Region are ranked according to the criteria outlined in this strategy. They have been identified and informed through consultation with key stakeholders, staff and the community.

Highest priority (critical) is given to programs which target:

- new and emerging threats,
- pest species which impact significantly on threatened species, populations and communities,
- pest species associated with health and disease risks, and
- pest species impacting substantially on economic enterprises.

In Northern Plains Region, critical priority programs have been largely identified from the NSW Fox Threat Abatement Plan, the Priority Action Statement and the Biodiversity Priorities for Widespread Weeds. In total, there have been forty four (44) critical priority programs, two (2) high priority programs, twenty five (25) medium priority programs and forty three (43) low priority programs identified and listed within this strategy. In addition, a number of specific and emerging pest species threats have also been identified.

Management programs to address the priorities that have been identified within this strategy will be listed in the annual Regional Operations Plan. The Region has, and will continue to work with neighbours, Livestock Health and Pest Authorities, Local Control Authorities and other departments to implement and promote cooperative pest control programs.

## Acronyms

The following acronyms are used throughout this document.

<b>Acronym</b>	<b>Expanded Text</b>
AA	Aboriginal Area
AMS	Asset Maintenance System
BPWW	Biodiversity Priorities for Widespread Weeds <a href="http://www.environment.nsw.gov.au/cmaweeds/">http://www.environment.nsw.gov.au/cmaweeds/</a>
CCA	Community Conservation Area
EEC	Endangered Ecological Community
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
KTP	Key Threatening Process under the TSC Act
LCA	Local Control Authority
LHPA	Livestock Health and Pest Authority
NP	National Park
NPR	Northern Plains Region
NPWS	NSW National Parks and Wildlife Service
NR	Nature Reserve
NSW	New South Wales
PAS	Priorities Action Statement
ROP	Regional Operations Plan
SCA	State Conservation Area
TAP	Threat Abatement Plan
TSC Act	<i>Threatened Species Conservation Act 1995</i>
WDCA	Wild Dog Control Association
WoNS	Weed of National Significance



# 1. Introduction

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

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

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

Part A of the strategy provides the broader planning framework for the management of pests by 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 corporate framework from Part A to prioritise specific pest management programs. These priorities will be included in Regional Operations Plans (ROPs) and implemented through the Asset Maintenance System (AMS). It also broadly identifies pest distribution and associated impacts across the Region.

## 2. Regional overview

The Northern Plains Region of the National Parks and Wildlife Service has responsibility for managing over 550 000 hectares of the protected area reserve system in central north New South Wales. The Region stretches from Geurie and Peak Hill in the southwest to Gunnedah in the east, north to the Queensland border near Yetman, and west to the Narran River and the townships of Warren and Narromine (see 3. Regional Map).

The Region is divided into four management areas with work centres based at Narrabri, Coonabarabran, Baradine and Dubbo. In partnership with the community, these Areas manage a combined total of 562,759 hectares in 76 reserves comprising 21 national parks, 24 nature reserves, 25 state conservation areas and 6 Aboriginal areas. The Region assumed management responsibility of 39 of these reserves in December 2005 following the dedication of approximately 295000 hectares as a result of the Brigalow Belt South and Nandewar Bioregional assessment process. These reserves are collectively known as Community Conservation Areas (CCAs) and are dedicated under the *Brigalow and Nandewar Community Conservation Area Act 2005 (NSW)* and the *National Parks and Wildlife Act 1974 (NSW)*. The CCAs are

in 3 zones according to their reserve category and management intent – Zone 1 National Park, Zone 2 Aboriginal Area and Zone 3 State Conservation Area.

In 2010, several former State forests were gazetted as conservation reserves under the National Parks Estate (South West Cypress) Reservations Bill. Additionally at this time, several small areas of Crown Land within the Brigalow and Nandewar Bioregions were added to the reserve system to complete the reservation components of the *Brigalow and Nandewar Community Conservation Act (2005)*.

A wide and varied range of pests occur due to the diversity of landscapes within the region. The reserve system includes sub-alpine mountain ranges, gorges, woodlands, floodplains, native grasslands and wetlands. Within these there are occurrences of a number of threatened species including, Malleefowl, Brush-tailed Rock Wallabies and Black-striped Wallabies; as well as significant Aboriginal and non-Aboriginal heritage, wilderness areas and Ramsar wetlands.

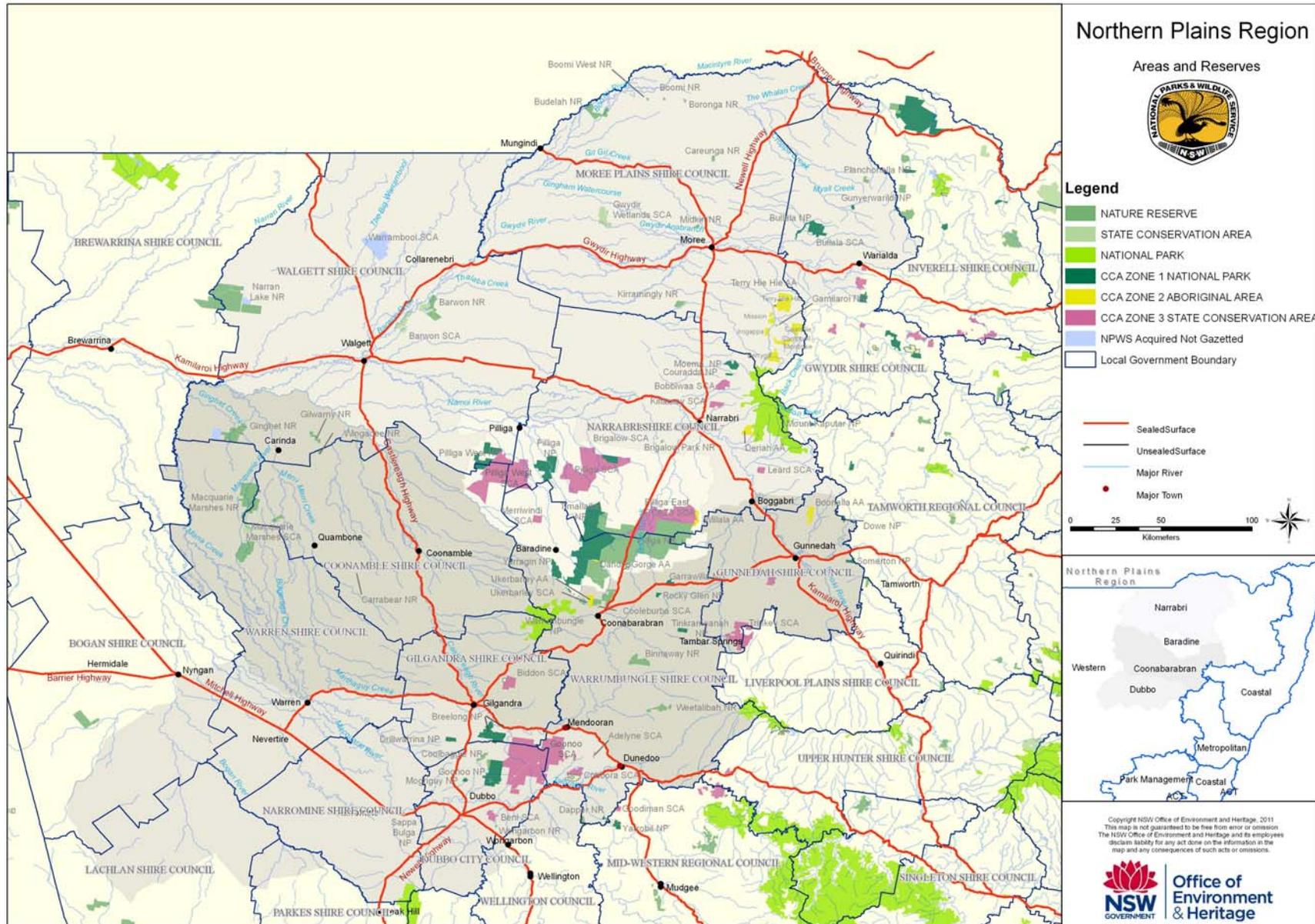
Pest control programs continue to be an integrated management priority for all reserves within the Region, with significant investment of staff time and operating funding annually. There is now seven designated pest staff within the Region.

The highest priority pest control programs within Northern Plains Region are specifically aimed at protecting species, populations and communities declared under the NSW Threatened Species Conservation Act. Examples of such programs include;

- Reducing the impact of feral goats and foxes on populations of Brush-tailed Rock Wallabies
- Reducing the impact of foxes on Malleefowl
- Reducing the impact of foxes and feral pigs on ground nesting birds in wetland reserves
- Reducing the impact of weeds in Endangered Ecological Communities (EECs) and where they impact on threatened species

The Region has and will continue to work with neighbours, Livestock Health and Pest Authorities, Local Control Authorities and other departments to promote and increase the number of cooperative control programs carried out. Over recent years these have been very successful, particularly around the Goonoo National Park/ State Conservation Area, Macquarie Marshes Nature Reserve, Narran Lake Nature Reserves, Gwydir Wetlands State Conservation Area, Planchonella Nature Reserve and Mount Kaputar National Park.

### 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 TAPs, PAS and BPWW. e.g. undertake fox control at the Warrumbungle priority site for brush-tailed rock wallaby as identified in the Fox TAP;

#### *C-HD (Health and Disease)*

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

#### *C-EC (Economic)*

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

#### *C-NE (New and Emerging)*

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

### High priority

#### *H-IH (International Heritage)*

Programs that target pests that impact significantly on World Heritage or international heritage values, e.g. control of rabbits impacting on World Heritage values of Mungo NP; pest control in Ramsar wetlands;

#### *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 biological control agent becomes available.

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

## 5. Table of prioritised regional pest programs

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

Area	Reserve(s)	Site name	Target pests or weeds	Asset at risk	Aim of Control	Action	Priority
Coonabarabran	Warrumbungle National Park	Warrumbungle NP	Fox	Brush-tailed Rock Wallaby	Asset protection	Baiting, M44 ejectors, ground shooting	C-TSC
Coonabarabran	Macquarie Marshes Nature Reserve	Macquarie Marshes NR	Fox	Ground nesting waterbirds	Asset protection	Baiting, M44 ejectors	C-TSC
Narrabri	Mount Kaputar National Park	Beresford Park and Carinya	Fox	Brush-tailed Rock Wallaby	Asset protection	Baiting, M44 ejectors, ground shooting	C-TSC
Narrabri	Narran Lake Nature Reserve	Narran Lake NR	Fox	Ground nesting waterbirds	Asset protection	Baiting, M44 ejectors, ground shooting	C-TSC
Dubbo	Goonoo National Park, Goonoo State Conservation Area, Coolbaggie Nature Reserve, Cobbora State Conservation Area, Breelong National Park	Goonoo NP & SCA, Coolbaggie NR, Cobbora SCA, Breelong NP	Fox	Malleefowl	Asset protection	Baiting, M44 ejectors	C-TSC
Narrabri	Mount Kaputar National Park	Mount Kaputar NP	Fox	Border Thick-tailed Gecko, Australian Brush-turkey (population)	Asset protection	Baiting	C-TSC
Narrabri	Deriah Aboriginal Area	Deriah AA	Fox	Australian Brush-turkey (population)	Asset protection	Baiting	C-TSC

Narrabri	Terry Hie Hie Aboriginal Area	Terry Hie Hie AA	Fox	Border Thick-tailed Gecko, Five-clawed Worm-skink	Asset protection	Baiting	C-TSC
Baradine	Pilliga National Park	Pilliga NP	Fox	Pilliga Mouse	Asset protection	Baiting, M44 ejectors	C-TSC
Baradine	Pilliga State Conservation Area	Pilliga SCA	Fox	Pilliga Mouse	Asset protection	Baiting, M44 ejectors	C-TSC
Baradine	Pilliga Nature Reserve	Pilliga NR	Fox	Pilliga Mouse	Asset protection	Baiting, M44 ejectors	C-TSC
Baradine	Timallallie National Park	Timallallie NP	Fox	Pilliga Mouse	Asset protection	Baiting, M44 ejectors	C-TSC
Baradine	Pilliga East State Conservation Area	Pilliga East SCA	Fox	Pilliga Mouse	Asset protection	Baiting, M44 ejectors	C-TSC
Baradine	Pilliga East Aboriginal Area	Pilliga East AA	Fox	Pilliga Mouse	Asset protection	Baiting, M44 ejectors	C-TSC
Coonabarabran	Warrumbungle National Park	Warrumbungle NP	Feral Goat	Brush-tailed Rock Wallaby	Asset protection	Aerial shooting	C-TSC
Coonabarabran	Boonalla Aboriginal Area	Boonalla AA	Feral Goat	Border Thick-tailed Gecko	Asset protection	Aerial shooting	C- TSC
Narrabri	Mount Kaputar National Park	Mount Kaputar NP	Feral Goat	Brush-tailed Rock Wallaby, Border Thick-tailed Gecko, Little Bentwing-bat	Asset protection	Aerial shooting	C-TSC
Coonabarabran	Macquarie Marshes Nature Reserve	Macquarie Marshes NR	Feral Pig	Ground nesting waterbirds	Asset protection	Aerial shooting, trapping, baiting	C-TSC

Narrabri	Narran Lake Nature Reserve	Narran Lake NR	Feral Pig	Ground nesting waterbirds, Winged Peppercress	Asset protection	Aerial shooting, trapping	C-TSC
Narrabri	Bobbiwaa State Conservation Area	Bobbiwaa SCA	Feral Pig	Spiny Peppercress	Asset protection	Baiting, trapping	C-TSC
Narrabri	Brigalow Park Nature Reserve and Brigalow State Conservation Area	Brigalow Park NR and Brigalow SCA	Feral Pig	Spiny Peppercress	Asset protection	Aerial shooting, trapping	C-TSC
Narrabri	Gwydir Wetlands State Conservation Area	Gwydir Wetlands SCA	Feral Pig	Neighbours crops	Asset protection	Aerial shooting, baiting	C-EC
Narrabri	Planchonella Nature Reserve	Planchonella NR	Feral Pig	Neighbouring crops	Asset protection	Aerial shooting, baiting	C-EC
Narrabri	Gunyerwarildi National Park	Gunyerwarildi NP	Feral Pig	Neighbouring crops	Asset protection	Aerial shooting, baiting	C - EC
Narrabri	Budelah Nature Reserve	Budelah NR	Feral Pig	Neighbours crops	Asset protection	Aerial shooting, trapping	C-EC
Baradine	Pilliga Nature Reserve	Salisbury Waterhole	Feral Pig	Aquatic EEC	Asset protection	Baiting, trapping	C-TSC
Baradine	Pilliga National Park	Gilgai Area	Feral Pig	Myriophyllum implicatum	Asset protection	Baiting, trapping	C-TSC
Coonabarabran	Warrumbungle National Park	Hells Hole	Blackberry	White Box, Ironbark, Black Pine woodland and Warrumbungle Star Bush	Asset protection	Foliar spraying	C-TSC
Coonabarabran	Boonalla Aboriginal Area	Boonalla AA (eastern boundary and area bounded by fire trails)	Tiger Pear, Prickly Pear	Koala	Asset protection	Foliar spraying	C-TSC

Coonabarabran	Ukerbarley State Conservation Area	Ukerbarley SCA	Blackberry, Tree of Heaven, St Johns Wort	Carex Sedgeland	Asset protection	Foliar spraying	C-TSC
Narrabri	Budelah, Boomi, Boomi West and Boronga Nature Reserves	Budelah, Boomi, Boomi West and Boronga NRs	Spiny Burr Grass, Buffel Grass, Prickly Pear	Carbeen Open Forest	Asset protection	Foliar spraying	C-TSC
Narrabri	Bullala National Park	Bullala NP	African Boxthorn, Prickly Pear	Carbeen Open Forest	Asset protection	Foliar spraying	C-TSC
Narrabri	Bobbiwaa State Conservation Area	Bobbiwaa SCA	Mothers of Millions, Prickly Pear, Bathurst Burr, Noogoora Burr	Spiny Peppergrass	Asset protection	Foliar spraying	C-TSC
Narrabri	Kirramingly Nature Reserve	Kirramingly NR	Lippia, African Boxthorn, Noogoora Burr, Bathurst Burr, Prickly Pear.	Bluegrass	Asset protection	Foliar spraying	C-TSC
Narrabri	Campbell and Montrose Aboriginal Areas	Campbell and Montrose AAs	Coolatai Grass	Bluegrass	Asset protection	Foliar spraying	C-TSC
Narrabri	Budelah Nature Reserve	Budelah NR	Prickly Pear, Lippia, Mimosa Bush	Coolibah-Black Box Woodland	Asset protection	Foliar spraying	C-TSC
Narrabri	Mount Kaputar National Park	Beresford Park	Mothers of Millions, African Boxthorn, Cotton Bush, White Cedar	Semi-evergreen Vine Thicket	Asset protection	Foliar spraying	C-TSC
Narrabri	Terry Hie Hie Aboriginal Area	Cap and Bonnett Creek	Green Cestrum, Prickly Pear, Noogoora Burr	Box Gum Woodland	Asset protection	Foliar spraying	C-TSC
Narrabri	Gamilaroi Nature Reserve	Gamilaroi NR	Prickly Pear	Cadellia pentastylis - Ooline community	Asset protection	Foliar spraying	C-TSC

Narrabri	Mount Kaputar National Park	Ningadoo	Green Cestrum, Prickly Pear, Mothers of Millions, White Cedar	Cadellia pentastylis - Ooline community and riparian vegetation	Asset protection	Foliar spraying	C-TSC
Narrabri	Narran Lake Nature Reserve	Narran Lake NR	Lippia, Bathurst Burr, Noogoora Burr, Prickly Pear	Ramsar wetland	Asset protection	Foliar spraying	C-TSC
Narrabri	Gunyerwarildi National Park	Gunyerwarildi NP	Coolatai Grass, African Boxthorn, Prickly Pear	Grassy White Box Woodland	Asset protection	Foliar spraying	C-TSC
Narrabri	Planchonella Nature Reserve	Planchonella NR	Coolatai Grass, Prickly Pear	Semi-evergreen Vine Thicket	Asset protection	Foliar spraying	C-TSC
Baradine	Timallallie National Park	Bugaldie Creek	Tiger Pear, Noogoora Burr	Box Gum Woodland, Pilliga Mouse, Koala	Asset protection	Foliar spraying	C-TSC
Baradine	Timallallie National Park	The Duke	St Johns Wort, Blackberry, Prickly Pear	Fuzzy Box, Box Gum Woodland	Asset protection	Foliar spraying	C-TSC
Baradine	Pilliga National Park	Quegobla – Etoo Creek	Tiger Pear, Prickly Pear, Noogoora Burr	Box Gum Woodland, Koala	Asset protection	Foliar spraying	C-TSC
Baradine	Pilliga State Conservation Area	Talluba Creek	Tiger Pear, Prickly Pear	Box Gum Woodland, Koala	Asset protection	Foliar spraying	C-TSC
Baradine	Pilliga State Conservation Area	Tinegie Creek	Tiger Pear	Box Gum Woodland, Koala	Asset protection	Foliar spraying	C-TSC
Baradine	Merriwindi State Conservation Area	Merriwindi SCA	Tiger Pear, Spiny Burr Grass	Box Gum Woodland	Asset protection	Foliar spraying	C-TSC

Baradine	Yarragin National Park	South Yarragin	Bathurst Burr, Noogoora Burr, Prickly Pear	Grassy Box Gum Woodland	Asset protection	Foliar spraying	C-TSC
Baradine	Pilliga West State Conservation Area	Pilliga West SCA	African Boxthorn, Tiger Pear	Box Gum Woodland	Asset protection	Foliar spraying	C-TSC
Baradine	Willala Aboriginal Area	Willala Knobs	Prickly Pear	Semi-evergreen Vine Thicket	Asset protection	Foliar spraying	C-TSC
Dubbo	Goonoo State Conservation Area	Goonoo SCA – Northern Boundary	Prickly Pear	Inland Grey Box Woodland	Asset protection	Foliar spraying	C-TSC
Dubbo	Wongarbon Nature Reserve	Wongarbon NR	Coolatai Grass	Inland Grey Box Woodland	Asset protection	Foliar spraying	C-TSC
Dubbo	Wongarbon Nature Reserve	Wongarbon NR – Northern Boundary	Mothers of Millions	Ironbark Woodland	Asset protection	Foliar spraying	C-TSC
Dubbo	Yarrobil National Park	Yarrobil NP	St Johns Wort	Acacia flocktoniae	Asset protection	Foliar spraying	C-TSC
All Areas	All reserves	All reserves	Wild Dog	Neighbours stock	Asset protection	Trapping, baiting	C-EC
Baradine	Willala Aboriginal Area	Willala AA	Feral Goat	Aboriginal Cultural Heritage Sites	Asset protection	Mustering	H-CH
Baradine	Pilliga Nature Reserve	Pilliga NR	Feral Goat	Aboriginal Cultural Heritage Sites	Asset protection	Mustering	H-CH
Coonabarabran	Trinkey State Conservation Area	Trinkey SCA	Feral Pig	Neighbours crops	Asset protection	Baiting	M-CP
Coonabarabran	Somerton National Park	Somerton NP	Feral Pig	Neighbours crops	Asset protection	Baiting, Trapping	M-CP

Coonabarabran	Ginghet Nature Reserve	Ginghet NR	Feral Pig	Neighbours livestock	Asset protection	Baiting	M-CP
Coonabarabran	Warrumbungle National Park	Warrumbungle NP	Green Cestrum		Containment	Foliar spraying	M-CP
Coonabarabran	Warrumbungle National Park	Warrumbungle NP (Central Valley)	Blue Heliotrope, Paterson's Curse, St Johns Wort, Blackberry, Prickly Pear, Khaki weed	Recreation and aesthetic values	Asset protection	Foliar spraying	M-RA
Coonabarabran	Warrumbungle National Park	Warrumbungle NP	Feral Pig	Park values, neighbours crops	Asset protection	Trapping	M-RA
Coonabarabran	Ukerbarley State Conservation Area and Aboriginal Area	Ukerbarley SCA & AA	Feral Pig	Permanent spring, Carex Sedgeland	Asset protection	Trapping, baiting	M-RA
Narrabri	Warrambool State Conservation Area	Warrambool SCA	Fox	Neighbours livestock	Asset protection	Baiting	M-CP
Narrabri	Couradda National Park	Couradda NP	Feral Pig	Neighbours crops	Asset protection	Baiting, Trapping	M-CP
Narrabri	Moema National Park	Moema NP	Feral Pig	Neighbours crops	Asset protection	Baiting, Trapping	M-CP
Narrabri	Terry Hie Hie Aboriginal Area	Terry Hie Hie, Berrygil, Campbell, Montrose	Feral Pig	Neighbours crops / livestock	Asset protection	Baiting	M-CP
Narrabri	Bullala National Park	Bullala NP	Feral Pig	Neighbours crops / livestock	Asset protection	Baiting	M-CP
Narrabri	Barwon Nature Reserve and State Conservation Area	Barwon NR & SCA	Feral Pig	Neighbours crops / livestock	Asset protection	Aerial shooting, Baiting	M-CP

Narrabri	Warrambool State Conservation Area	Warrambool SCA	Feral Pig	Neighbours livestock	Asset protection	Baiting	M-CP
Narrabri	Mount Kaputar National Park	Mount Kaputar NP	Feral Pig	Park values, neighbours crops	Asset protection	Trapping	M-RA
Narrabri	Mount Kaputar National Park	Upper Bullawa Creek	Green Cestrum, Noogoora Burr, White Cedar		Containment	Foliar spraying	M-CP
Baradine	Pilliga National Park	Pilliga NP	Fox	Neighbours livestock	Asset protection	Baiting	M-CP
Baradine	Pilliga West National Park and State Conservation Area	Pilliga West NP & SCA	Fox	Neighbours livestock	Asset protection	Baiting	M-CP
Baradine	Pilliga West National Park and State Conservation Area	Pilliga West NP & SCA	Feral Pig	Neighbours crops and livestock	Asset protection	Baiting, Trapping	M-CP
Baradine	Pilliga State Conservation Area	Pilliga SCA	Feral Pig	Neighbours crops and livestock	Asset protection	Baiting, Trapping	M-CP
Baradine	Timallallie National Park	Timallallie NP	Feral Pig	Neighbours crops and livestock	Asset protection	Baiting, Trapping	M-CP
Dubbo	Dapper Nature Reserve	Dapper NR	Fox	Neighbours livestock	Asset protection	Baiting	M-CP
Dubbo	Yarrobil National Park	Yarrobil NP	Fox	Neighbours livestock	Asset protection	Baiting	M-CP
Dubbo	Drillwarrina National Park	Drillwarrina NP	Fox	Neighbours livestock	Asset protection	Baiting	M-CP

Dubbo	Goodiman State Conservation Area	Goodiman SCA	Fox	Neighbours livestock	Asset protection	Baiting	M-CP
Coonabarabran	Somerton National Park	Somerton NP	Fox	Neighbours livestock and native fauna	Asset protection	Baiting	L-PP
Coonabarabran	Trinke State Conservation Area	Trinke SCA	Fox	Neighbours livestock and native fauna	Asset protection	Baiting	L-PP
Coonabarabran	Wondoba State Conservation Area	Wondoba SCA	Fox	Neighbours livestock and native fauna	Asset protection	Baiting	L-PP
Coonabarabran	Biddon State Conservation Area	Biddon SCA	Fox	Neighbours livestock and native fauna	Asset protection	Baiting	L-PP
Coonabarabran	Ukerbarley State Conservation Area and Aboriginal Area	Ukerbarley SCA & AA	Fox	Native fauna	Asset protection	Baiting	L-PP
Coonabarabran	Warrumbungle National Park	Warrumbungle NP (non Fox TAP area)	Fox	Native fauna	Asset protection	Baiting	L-PP
Coonabarabran	Warrumbungle National Park	Warrumbungle NP (Central Valley)	Rabbit	Native flora	Asset protection	Fumigation, warren ripping, biological control	L-PP
Coonabarabran	Binnaway Nature Reserve, Weetalibah Nature Reserve, Tinkrameanah National Park, Garrawilla National Park	Binnaway NR, Weetalibah NR, Tinkrameanah NP, Garrawilla NP	Feral Pig	Neighbour relations	Asset protection	Baiting, trapping	L-PP
Coonabarabran	Trinke State Conservation Area	Trinke SCA	Mothers of Millions, Tiger Pear, Prickly Pear		Containment	Foliar spraying	L-PP
Coonabarabran	Dowe National Park	Dowe NP	Prickly Pear, Tiger Pear		Containment	Foliar spraying	L-PP

Coonabarabran	Warrumbungle National Park	Warrumbungle NP (Gunneemooroo)	Spiny Burr Grass, Prickly Pear		Containment	Foliar spraying	L-PP
Coonabarabran	Biddon State Conservation Area	Biddon SCA	Prickly Pear, Blue Heliotrope		Containment	Foliar spraying	L-PP
Coonabarabran	Somerton National Park	Somerton NP	Bathurst Burr, Noogoora Burr, Prickly Pear		Containment	Foliar spraying	L-PP
Coonabarabran	Wondoba State Conservation Area	Wondoba SCA	Prickly Pear		Containment	Foliar spraying	L-PP
Narrabri	Gwydir Wetlands State Conservation Area	Gwydir Wetlands SCA	Fox	Native fauna	Asset protection	Baiting	L-PP
Narrabri	Killarney State Conservation Area, Bobbiwaa State Conservation Area, Couradda National Park, Moema National Park	Killarney SCA, Bobbiwaa SCA, Couradda NP, Moema NP	Fox	Neighbour relations	Asset protection	Baiting	L-PP
Narrabri	Leard State Conservation Area	Leard SCA	Feral Pig	Neighbour relations	Asset protection	Baiting	L-PP
Narrabri	Brigalow Nature Reserve, Brigalow State Conservation Area	Brigalow NR, Brigalow SCA	Feral Pig	Neighbour crops	Asset protection	Trapping	L-PP
Narrabri	Brigalow Park Nature Reserve and Brigalow State Conservation Area	Brigalow Park NR and Brigalow SCA	Noogoora Burr, Bathurst Burr, Prickly Pear		Containment	Foliar spraying	L-PP
Narrabri	Moema National Park	Moema NP	African Boxthorn, Noogoora Burr, Prickly Pear		Containment	Foliar spraying	L-PP
Narrabri	Killarney State Conservation Area	Killarney SCA	African Boxthorn, Prickly Pear		Containment	Foliar spraying	L-PP

Narrabri	Leard State Conservation Area	Leard SCA	African Boxthorn, Prickly Pear		Containment	Foliar spraying	L-PP
Narrabri	Mount Kaputar National Park	Mount Kaputar NP (Eastern boundary)	Sweet Briar, Prickly Pear		Containment	Foliar spraying	L-PP
Narrabri	Bullawa Creek State Conservation Area	Bullawa Creek SCA	Mothers of Millions, Prickly Pear		Containment	Foliar spraying	L-PP
Narrabri	Gwydir Wetlands State Conservation Area	Gwydir Wetlands SCA	Mimosa Bush, Prickly Pear		Containment	Foliar spraying	L-PP
Narrabri	Couradda National Park	Couradda NP	Mothers of Millions, Prickly Pear		Containment	Foliar spraying	L-PP
Narrabri	Berrygil Aboriginal Area	Berrygil AA (cultural heritage site)	Noogoora Burr, Prickly Pear	Visitor area	Asset protection	Foliar spraying	L-LP
Baradine	Pilliga East State Conservation Area, Pilliga Nature Reserve	Pilliga East SCA, Pilliga NR (Borah Creek)	Rabbit	Native flora	Asset protection	Fumigation	L-PP
Baradine	Pilliga National Park	Pilliga NP (Gilgais)	Star Flower, Mothers of Millions	Native flora	Asset protection	Foliar spraying	L-PP
Baradine	Timallallie National Park	Wittenbra Springs	Noogoora Burr	Natural springs and riparian vegetation	Asset protection	Foliar spraying	L-PP
Baradine	Pilliga West National Park, Pilliga West State Conservation Area	Pilliga West NP, Pilliga West SCA (Pilliga to Coonamble road)	Mothers of Millions, Tiger Pear, Tree Pear, Prickly Pear		Containment	Foliar spraying	L-PP
Baradine	Pilliga West National Park, Pilliga West State Conservation Area	Pilliga West NP, Pilliga West SCA (Brumby road)	African Boxthorn, Prickly Pear		Containment	Foliar spraying	L-PP
Baradine	Pilliga East State Conservation Area	Pilliga East SCA (Airlands & Yamborah)	Blue Heliotrope, Spiny Burr Grass, Thistles		Containment	Foliar spraying	L-PP

Baradine	Pilliga East State Conservation Area, Timallallie National Park, Pilliga Nature Reserve	Pilliga East SCA, Timallallie NP, Pilliga NR (No.1 Break, Delwood road, Scratch road)	Prickly Pear		Containment	Foliar spraying	L-PP
Dubbo	Dubbo Area small reserves	Dubbo Area small reserves	Rabbit	Native flora	Asset protection	Fumigation	L-PP
Dubbo	Goonoo National Park, Goonoo State Conservation Area	Goonoo NP & SCA	Rabbit	Native flora	Asset protection	Fumigation	L-PP
Dubbo	Breelong National Park, Mogriguy National Park, Drillwarrina National Park	Breelong NP, Mogriguy NP, Drillwarrina NP	Feral Pig	Neighbour relations	Asset protection	Trapping	L-PP
Dubbo	Goonoo National Park, Goonoo State Conservation Area	Goonoo NP & SCA (Riley's Dam, No.2 Bore)	Blue Heliotrope, Prickly Pear, Paterson's Curse, Bathurst Burr, Noogoora Burr	Visitor area	Asset protection	Foliar spraying	L-LP
Dubbo	Sappa Bulga National Park	Sappa Bulga NP	Bridal Creeper, African Boxthorn, Prickly Pear		Containment	Foliar spraying	L-PP
Dubbo	Adelyne State Conservation Area	Adelyne SCA	St Johns Wort, African Boxthorn, Prickly Pear, Wandering Jew		Containment	Foliar spraying	L-PP
Dubbo	Cobbora State Conservation Area	Cobbora SCA	African Boxthorn, Spiny Burr Grass, Prickly Pear		Containment	Foliar spraying	L-PP
Dubbo	Beni State Conservation Area	Beni SCA	African Boxthorn, Mothers of Millions, Paterson's Curse, Bathurst Burr, Prickly Pear		Containment	Foliar spraying	L-PP

Dubbo	Coolbaggie Nature Reserve	Coobaggie NR	Prickly Pear, Century Plant		Containment	Foliar spraying	L-PP
Dubbo	Breelong National Park	Breelong NP	African Boxthorn, Noogoora Burr, Prickly Pear, Rope Pear		Containment	Foliar spraying	L-PP
Dubbo	Mogriguy National Park	Mogriguy NP	African Boxthorn, Prickly Pear		Containment	Foliar spraying	L-PP
Dubbo	Drillwarrina National Park	Drillwarrina NP	African Boxthorn, Paterson's Curse, Prickly Pear		Containment	Foliar spraying	L-PP

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## 6. Consultation

The Northern Plains Regional Pest Management Strategy was developed through consultation with key stakeholders, staff and the community. This included a stakeholder consultation forum, internal consultation and public exhibition of the draft Strategy. The public exhibition invited feedback from the community, other government agencies and stakeholder groups.

The Northern Plains Region Stakeholder Consultation Forum was held in Coonabarabran on Wednesday 7<sup>th</sup> September 2011. The forum was attended by 33 key private and government stakeholders from Livestock Health and Pest Authorities, Shire Councils, Forests NSW, Primary Industries, Catchment Management Authorities, NPWS Advisory Committees and private landholders.

A number of the issues identified were general landscape pest species issues and broad pest management issues not specific to reserves in Northern Plains Region. These are not addressed in the Pest Management Strategy because specific threats within reserves have not been identified, efficient and effective management techniques do not exist or management of such issues is not within the scope of NPWS. Examples of such issues included; starlings, gambusia, honey bees, carp, Indian Myna, farming/harvesting of goats, issues relating to hunting of pest species and reintroductions of dingoes.

A number of emerging issues where specific pest species are not yet present but threaten to establish in reserves within the Region were identified. Such issues included; Hudson Pear, Mesquite, Parkinsonia, Parthenium Weed, Tropical Soda Apple, Fireweed, Water Lettuce, Salvinia and Hymenachnie. These, along with other emerging threats, and some key reserves for surveillance have been identified and discussed in Part B Section 8.2.

A number of emerging pest issues where infestations exist within reserves, or key issues relating to widespread pest species were identified by participants at the forum. These included:

- Feral Deer (refer to Part B Section 8.2)
- Horses (refer to Part B Section 8.2)
- Lippia / Lippia in wetlands (refer to Part B Section 6.16)
- Coolatai Grass / Coolatai Grass in reserves south of Coonabarabran (refer to Part B Section 6.7)
- Blackberry in reserves around Coonabarabran (refer to Part B Section 6.8)
- Pigs / Pigs in wetlands / Pigs where they have an economic impact on adjoining enterprises (refer to Part B Section 6.3)
- Boxthorn / Boxthorn in Carbeen and Coolibah – Black Box communities (refer to Part B Section 6.10)

- Foxes / Foxes where they threaten Brush-tailed Rock Wallabies and Malleefowl (refer to Part B Section 6.1)
- Bridal Creeper (refer to Part B Section 6.19)
- Carnivore pests (foxes and wild dogs) where they impact on adjoining enterprises (refer to Part B Section 6.1 & 6.4)

A number of management strategies were raised during the forum. These included:

- The need for cooperative management with neighbours and other agencies (refer to Part A Section 6.3 Goal 2 Objective 2.2)
- Management to include planning and prioritisation (refer to Part B Section 4)
- Recording, monitoring and evaluation of pest control programs (refer to Part A Section 7)
- Adoption of integrated pest management (refer to Part A Section 6.3 Goal 2 Objective 2.2)
- Use of volunteers to assist with pest management programs (refer to Part A Section 6.3 Goal 3 Objective 3.2)
- Education of staff to recognise and report new weed incursions (refer to Part A Section 6.3 Goal 1 Objective 1.1)

Internal consultation involved liaison with key local Area staff to accurately identify and prioritise pest distribution and management programs. Comment was also sought from local staff on the draft strategy.

## 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.rirdc.gov.au/programs/national-rural-issues/weeds/weeds_home.cfm)

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

## European Red Fox (*Vulpes vulpes*)

### Distribution and abundance

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

Foxes occur in all reserves throughout the Northern Plains Region (NPR) in varying densities (See table 1).

### Impacts

The introduction of foxes into Australia has had a devastating impact on native fauna. Studies have shown that predation by foxes continues to suppress remnant populations of many species. Predation by foxes was the first key threatening process (KTP) to be listed under the *Threatened Species Conservation Act 1995* (NSW) (TSC). Foxes are an agent for the dispersal of several species of weeds and are a potential carrier of disease. They are also significant predators of domestic stock including lambs and poultry; predation by foxes has the potential to reduce lambing rates significantly (NSW NPWS 2001).

The NSW Fox Threat Abatement Plan identifies foxes as a threat to a number of species that occur in reserves in NPR, including Brush-tailed Rock Wallabies, Black-striped Wallabies, Malleefowl, and Brolgas. Foxes have also been identified in the priority action statement (PAS) as a threat to a number of endangered and vulnerable animal species and one endangered bird population that occur in the NPR. Additionally, the threat foxes pose to domestic stock makes them a problem around a number of reserves in the Region where neighbours have sheep breeding enterprises.

### Priorities for control

Brigalow Park (Brigalow Park NR & Brigalow SCA – Black-striped Wallaby), Mount Kaputar (Mount Kaputar NP & Deriah AA – Brush-tailed Rock Wallaby), Warrumbungle NP (Brush-tailed Rock Wallaby), Goonoo (Goonoo NP & SCA, Coolbaggie NR, Cobbora SCA & Breelong NP – Malleefowl), Macquarie Marshes NR (Brolga) and Narran Lake NR (Brolga) have been identified as priority sites in the NSW Fox Threat Abatement Plan.

In addition, Boonalla AA (Border Thick-tailed Gecko), Macquarie Marshes NR (Magpie Goose) Mount Kaputar NP (Border Thick-tailed Gecko & Australian Brush-turkey population), Deriah AA (Australian Brush-turkey population), Terry Hie Hie AA (Border Thick-tailed Gecko & Five-clawed Worm-skink), Narran Lake NR (Black-necked Stork, Freckled Duck & Magpie Goose), Pilliga NP (Pilliga Mouse), Pilliga SCA (Pilliga Mouse), Timallallie NP (Pilliga Mouse), Pilliga East SCA (Pilliga Mouse), Willala AA (Pilliga Mouse) and Mogriguy NP (Turquoise Parrot) have actions identified for fox control in the PAS.

Fox control in Warrambool SCA, Barwon SCA, Pilliga NP, Pilliga West NP, Pilliga West SCA, Dapper NR, Yarrobil NP, Drillwarrina NP and Goodiman SCA, in conjunction with cooperative group fox baiting programs, is a medium priority.

Fox control may be carried out in a number of other reserves within the Region for the protection of neighbouring livestock. Where this is not a coordinated cooperative program, this will be a low priority.

## **Control**

Under the NSW Fox Threat Abatement Plan each priority site will have a site plan outlining the type and level of control that will be undertaken. In NPR, control at Fox TAP sites will include a combination of control techniques implemented as specified in the site plan.

Where fox control has been identified as an action for NPR reserves under the PAS, control will be implemented 2-3 times per year between March and September, targeting foxes during the peak dispersal period (autumn), when nutritional stresses are greatest (winter) and when common non-target species such as goannas are least active.

Fox control programs implemented in conjunction with local groups and/or to protect neighbouring livestock will be timed to coincide with cooperative efforts.

Where possible, control programs will be coordinated and implemented in collaboration with neighbours, Livestock Health & Pest Authorities (LHPAs) and other agencies. In addition, control programs will be implemented using a variety of bait types and/or a combination of control techniques including baiting, M44 ejectors and ground shooting.

## **Monitoring**

Recording of control effort and results, such as mapping locations of baits stations and M44 ejectors, and recording bait uptake, M44 ejector activations and ground shooting effort and results will be undertaken for all programs.

In addition, specific monitoring as outlined in each Fox TAP site plan will be implemented at NPR Fox TAP sites. This monitoring will include sand pad or camera monitoring of relative fox abundance, Brush-tailed Rock Wallaby population monitoring, Black-striped Wallaby population monitoring, monitoring of Malleefowl nests and monitoring of waterbird breeding events.

Some of this data will be analysed by the Pest Management Unit and published periodically as part of the review of the Fox Threat Abatement Plan. Additionally, this data will provide information for NPR on the effectiveness of specific high priority control programs and act as an indicator for other control sites.

## **Feral Goat (*Capra hircus*)**

### **Distribution and Abundance**

Feral goats occur in varying densities in all states of Australia. The most extensive populations live in semi-arid pastoral areas where the construction of permanent water supplies and the control of predators have modified natural habitat to suit feral goats. Significant populations also exist in higher rainfall agricultural areas where patches of scrub or forest offer protection from control (Parkes et al 1996).

In the Northern Plains Region, the most extensive populations occur in Mount Kaputar and Warrumbungle National Parks, Narran Lake Nature Reserve, Boonalla Aboriginal Area and areas of the Pilliga Nature Reserve and Community Conservation Areas. Smaller, more isolated populations occur at varying densities in Kirramingly, Macquarie Marshes and Weetalibah Nature Reserves, Deriah Aboriginal Area, Killarney State Conservation Area and Garrawilla National Park.

## **Impacts**

Feral goats compete with native animals for food, water and shelter. They contribute to soil erosion and can degrade cultural heritage sites. They can have substantial impacts on vegetation through eating established plants and preventing regeneration of seedlings particularly in sensitive areas such as rocky outcrops. They are also potential carriers of a number of endemic and exotic parasites and diseases. Competition and habitat degradation by feral goats is listed as a KTP under the *TSC Act 1995*.

Endangered Brush-tailed Rock Wallabies are the most significant species in the NPR to be impacted by feral goats through competition for food and shelter. Other vulnerable species occurring within the Region that are impacted by feral goats through habitat destruction or competition include the Border Thick-tailed Gecko and Little Bentwing-bat.

Due to feral goats inhabiting rocky outcrops and caves, they pose a threat to a number of important Aboriginal cultural heritage sites found within several Nature Reserves and Community Conservation Areas within the Region.

## **Priorities for control**

Control of feral goats to protect Brush-tailed Rock Wallabies (Warrumbungle and Mount Kaputar NPs) has been identified as a priority in this species recovery plan.

In addition, Mount Kaputar NP (Border Thick-tailed Gecko and Little Bentwing-bat) and Boonalla AA (Border Thick-tailed Gecko) have actions identified for feral goat control in the PAS.

Feral goat management to minimise damage to Aboriginal cultural heritage, in particular etchings found in a number of sandstone caves within the Pilliga NR, Dandry Gorge AA, Willala AA and Ukerbarley AA will be a high priority.

Feral goat control may be carried out in a number of other reserves within the Region to minimise impact on native vegetation. These programs will be a low priority.

## **Control**

Due to the remoteness, limited accessibility and abundance of natural watering points within Mount Kaputar and Warrumbungle NP and Boonalla AA efficient and effective feral goat control has been and will continue to be carried out via aerial culling when funding permits. In recent years programs in Mount Kaputar NP have at times been carried out in collaboration with LHPA programs on adjoining private and vacant crown land. Participation of these stakeholders provides a greater control effort and minimises the extent of reinvasion of feral goats from non-controlled land. The ongoing participation from these stakeholders will be encouraged but is dependent on funding attracted by LHPAs.

Feral goat management around Aboriginal cultural heritage sites within Pilliga NR, Dandry Gorge AA, Willala AA and Ukerbarley AA will be undertaken through a combination of physical site protection and other feral goat control techniques.

Feral goat control techniques that may be used in the Region include contract mustering and ground shooting. In addition, research trials currently underway aim to identify a suitable baiting toxin and technique that could assist with control in some reserves.

## **Monitoring**

Scat surveys, camera monitoring and visual sightings around Brush-tailed Rock Wallaby colonies will provide an indicator of feral goat presence and abundance within these areas.

Recording of control effort and results, such as mapping flight paths and controlled animals and recording mustering or ground shooting effort and results will be undertaken for all programs.

Information from staff, neighbours and visitors regarding sightings of feral goats and identified impacts will also provide rough indications of feral goat abundance and the general population change following control programs.

## **Feral Pig (*Sus scofra*)**

### **Distribution and Abundance**

Within Australia, feral pigs are widely distributed in Queensland, the North Territory, New South Wales and the Australian Capital Territory and only isolated populations occur in the other states. The most critical factors affecting their distribution are the needs for daily water and dense shelter. Provided these requirements are met, the density of populations is largely dependent upon the availability of preferred foods (Choquenot et al 1996).

In NPR, feral pigs can occur in varying densities in almost all reserves. The most extensive populations occur in and around the Macquarie Marshes and Narran Lake NRs and Gwydir Wetland SCA. High density populations can also occur in and around Planchonella NR, Gunyerwarildi NP, Budelah NR, Barwon NR & SCA, Warrambool SCA, Couradda NP, Moema NP, Bobbiwaa SCA, Brigalow Park NR, Brigalow SCA, Terry Hie Hie AA, Trinkey SCA, Somerton SCA, and Ginghet NR. Moderate populations occur in and around areas of Mount Kaputar and Warrumbungle National Parks, Boomi, Boomi West, Midkin and Careunga NRs, Pilliga NR and CCAs, Bullala NP, Killarney SCA and Biddon SCA.

### **Impacts**

Feral pigs cause habitat degradation through selective feeding, trampling damage and rooting for underground parts of plants and invertebrates. They can also impact on a number of native species through either predation or aggressive competition. They eat newborn lambs, reduce crop yields, damage fences, foul water sources and compete with stock for feed. Feral pigs are a potential carrier of a number of endemic and exotic parasites and diseases (Choquenot et al 1996). Predation, habitat degradation, competition and disease transmission by feral pigs is listed as a key threatening process under the NSW Threatened Species Conservation Act.

The most significant threats posed by feral pigs in the NPR are associated with predation and habitat destruction in the wetlands at Macquarie Marshes and Narran Lake NRs and Gwydir Wetlands SCA. These internationally recognised wetlands are Ramsar listed and provide important habitat for ground nesting waterbirds and other aquatic species. Feral pig control in Macquarie Marshes and Narran Lake NRs is listed in the PAS for the protection of several species of waterbirds.

Populations of feral pigs in and around Planchonella and Budelah NRs and Gunyerwarildi NP can cause extremely high losses in terms of damage to neighbours crops in the high yielding cropping areas. Similarly, they pose a high risk to crops

adjoining Barwon NR & SCA, Couradda NP, Moema NP, Bobbiwaa SCA, Brigalow Park NR, Brigalow SCA, Terry Hie Hie AA, Trinkey SCA and Somerton NP. Moderate populations in a number of other reserves have the potential to cause significant damage to neighbouring crops if left uncontrolled.

\*Feral pigs are a declared pest under the *Rural Lands Protection Act 1998*. This binds all land managers to control (continuously suppress and destroy) declared pest animals to the extent necessary to minimise the risk of the pest causing damage to any land.

### **Priorities for control**

Macquarie Marshes NR (Magpie Goose), Narran Lake NR (Black-necked Stork, Freckled Duck, Magpie Goose, Winged Peppercross), Brigalow Park NR & SCA (Spiny Peppercross) and Bobbiwaa SCA (Spiny Peppercross) have actions identified for feral pig control in the PAS. Given that Gwydir Wetlands SCA is also a Ramsar listed wetland and provides important habitat for waterbirds and other aquatic species it is also considered to be a critical priority for feral pig control.

In addition, in Pilliga NR, Salisbury Waterhole (listed as Aquatic Ecological Community in the Natural Drainage System of the Lowland Catchment of the Darling River) is considered an important permanent waterhole in the eastern Pilliga. Similarly, in Pilliga National Park (Gilgai area), *Myriophyllum implicatum* (listed as critically endangered) grows around the low lying wet areas. Both are critical priorities for feral pig control to minimise impacts on water quality, soil disturbance and other damage.

Due to the very high level of damage to crops and subsequent economic loss that feral pigs in Planchonella and Budelah NRs and Gunyerwarildi NP can cause, participation in cooperative control programs in and around these reserves is a critical priority.

Feral pigs also pose a risk to crops adjoining Barwon NR & SCA, Couradda NP, Moema NP, Bobbiwaa SCA, Brigalow Park NR, Brigalow SCA, Terry Hie Hie AA, Trinkey SCA and Somerton NP. These programs and programs targeting feral pigs in Mount Kaputar and Warrumbungle National Parks (to minimise the impacts on park values and neighbours) are a medium priority.

Periodically, LHPAs and/or landholder groups carry out cooperative feral pig control programs across areas that encompass NPR reserves. Participation in these cooperative control programs surrounding reserves within the region is important in terms of obtaining the greatest control, minimising reinvasion and maintaining and promoting good neighbour relationships. Participation in such programs will be a medium priority.

Feral pig control may be carried out in a number of other reserves within the Region to minimise impacts on other reserve values or neighbours. These programs will be a low priority.

### **Control**

Due to the limited access in the wetlands at Narran Lake and Macquarie Marshes NRs and Gwydir Wetlands SCA, control programs will be carried out primarily via aerial shooting. Where possible, this will be complimented by trapping or baiting programs undertaken during the year. During significant flooding and subsequent waterbird breeding events the control effort may increase in these reserves to afford greater protection during critical nesting periods.

All other control programs will be carried out using one or more of the following control methods; aerial shooting, baiting and/or trapping.

Programs aimed at protecting neighbours crops will be timed to control feral pigs to give greatest protection to crops. Where possible, these programs will be implemented in conjunction with local groups.

Where possible, all control programs will be coordinated and implemented in collaboration with neighbours, Livestock Health & Pest Authorities (LHPAs) and other agencies.

### **Monitoring**

During waterbird breeding events, mapping and recording of colonies and nest counts is undertaken to measure breeding success. Evidence of feral pig predation and disturbance should also be recorded.

Recording of control effort and results, such as mapping flight paths and controlled animals and recording trapping and baiting effort and results will be undertaken for all programs.

Information from staff, neighbours and visitors regarding sightings and damage from feral pigs will also provide rough indications of abundance and the general population change following control programs.

## **Wild Dogs (*Canis lupus sp.*)**

### **Distribution and abundance**

Populations of wild dogs (including dingoes) occur mainly along the Great Dividing Range, coastal hinterlands and in north-western NSW.

In the NPR, they are known to occur as isolated to scattered populations in Mount Kaputar NP, Deriah AA, Bullala NP, Warrumbungle NP, Macquarie Marshes NR & SCA, Ginget NR, Binnaway NR, Trinkey SCA, Biddon SCA, Tinkrameena NP, Ukerbarley AA & SCA, Goonoo NP & SCA, Drillwarrina NP, Yarrobil NP and Goodiman SCA, as well as within the collective Community Conservation Areas and Nature Reserve of the Pilliga.

### **Impacts**

With only isolated to scattered populations of wild dogs in the NPR, predation on native animals is likely to be of minimal impact. However, over recent years individual wild dogs have caused significant problems in terms of stock attacks on sheep on neighbouring properties adjoining Warrumbungle and Mount Kaputar National Parks.

Predation and hybridisation by Feral Dogs, *Canis lupus familiaris* is listed as a KTP under the *TSC Act 1995*.

### **Priorities for control**

Wild dogs, including dingoes, are a declared pest under the Rural Lands Protection Act 1998. This binds all land managers, including NPWS, to control (continuously suppress and destroy) declared pest animals to the extent necessary to minimise the risk of the pest causing damage to any land. As a result, the dingo is unprotected under Schedule 11 of the National Parks and Wildlife Act 1974, but it is a native animal and provisions have been put in place to conserve it. These provisions include the listing of core areas for conservation under Schedule 2 of the Wild Dog Pest Control Order.

In those areas of the state where wild dog attacks are common, Wild Dog Control Associations (WDCA) comprised of relevant stakeholders develop wild dog management plans that identify priorities for control across various land tenures, giving consideration to minimising livestock predation and conservation of the dingo in the core areas.

Because wild dogs and the associated attacks to livestock are uncommon, the development of WDCA and the subsequent management plans have not and will not occur in the NPR. However, in recent years there have been 1-2 reports of wild dog attacks to livestock adjoining NPWS reserves in NPR per year. In response to these attacks NPWS has implemented targeted control programs in conjunction with adjoining landholders. Within NPR, five individual wild dogs have been removed from NPWS reserves or nearby adjoining land in the past 4 years. As a result attacks on livestock have ceased in all areas for a significant period after the removal of the individual animals.

Control programs implemented in response to stock attacks on properties adjoining NPR reserves will be a Critical priority.

### **Control**

Due to the very low abundance of wild dogs and very sporadic incidence of stock attacks within the NPR, ongoing strategic control aimed at preventing livestock predation would be neither efficient nor effective. Reactive control targeting the individual wild dog that is attacking stock will be implemented in response to reports of livestock predation. The success of such control will be dependent upon prompt notification of attacks and the cooperation of all stakeholders including LHPAs, landholders and NPWS.

Control techniques may include trapping, baiting, ground shooting and/or opportunistic aerial shooting.

### **Monitoring**

Recording of reports from neighbours regarding stock attacks, wild dog control efforts and individuals removed will be carried out. Recording of wild dog presence will also occur in reserves where remote camera or sand pad monitoring programs are undertaken.

## **Control of other pest animals**

Infestations of rabbits, feral cats, deer, horses and feral cattle occur in some reserves in NPR. Generally, populations of these species are isolated and restricted in their distribution within reserves across the Region. Control programs targeting populations of these species have been identified as a lower priority than the control programs discussed above. Some opportunistic control of these species may be carried out during the higher priority programs. Specific control programs targeting these species will be planned and implemented where problems arise.

Several pest fish species including European Carp and Plague Minnow have been identified within a number of reserves across the NPR. Control of such species is limited and has not been identified as a priority.

## **Green Cestrum (*Cestrum parqui*)**

### **Distribution and abundance**

Green Cestrum originated in Chile and Peru. It was planted widely in Australia as a garden ornamental and hedge plant. Within Australia it is most commonly found in parts of Victoria, New South Wales and South-eastern Queensland (Parsons & Cuthbertson 1992).

In NPR, it occurs as isolated infestations along several creek lines in Warrumbungle NP, Mount Kaputar NP and Terry Hie Hie AA. In Warrumbungle NP, the infestation is found along Honeymoon Creek near the junction of Bugaldie Creek and in Bugaldie Creek below this junction. In Mount Kaputar NP, it is found at Ningadoo at the head of Eulah Creek and around Foggy Dell, along the upper reaches of Bullawa Creek. In Terry Hie Hie Aboriginal Area, infestations occur along Cap and Bonnet Creek.

### **Impacts**

Green Cestrum is an invasive plant that grows well on alluvial creek flats, often to the exclusion of other vegetation. It is toxic to domestic animals including cattle, sheep, horses, pigs and poultry and is also claimed to be toxic to birds and bees that feed on the fruit and flowers (Parsons & Cuthbertson 1992). The plant produces a large seed bank from which it readily re-establishes following treatment.

All incursions within the NPR occur in Narrabri Shire Council, Castlereagh Macquarie County Council and Moree Plains Shire Council areas. Green Cestrum has been declared a Class 3 weed under the *Noxious Weeds Act* in these areas.

### **Priorities for control**

Cap and Bonnet Creek (Terry Hie Hie AA – Box Gum Woodland EEC) and Eulah Creek (Mount Kaputar NP – riparian area) have been identified as priority sites in the NSW Biodiversity Priorities for Widespread Weeds (BPWW) project. Green Cestrum control at these sites are listed as critical priorities for control within the Region.

Green Cestrum control in Warrumbungle NP and Mount Kaputar NP has been an ongoing program for a number of years. As a result of past control efforts, the infestation has been reduced to a level that requires only follow up control of plants that are missed and new germinations. In addition, the Noxious Weeds Act requires that all Class 3 weeds are fully and continuously suppressed and destroyed. For these reasons, this program will be a medium priority.

### **Control**

Control can be carried out either via physical removal or herbicide application. Physical removal requires careful attention to remove the entire plant as persistent regrowth from roots can be common. A number of herbicides are registered for control. The application may include cut stump, basal bark or as an overall spray thoroughly wetting the plant in the active growth stage prior to flowering. Flowering occurs over several months during summer and autumn.

Both physical removal and herbicide application will be used to control infestations within NPR. Several different registered herbicides may be used.

### **Monitoring**

All infestations within NPR will be mapped and recorded. Photo points have been established at Cap and Bonnet Creek and Eulah Creek to monitor changes in understorey vegetation before and after treatment. These will continue to be periodically recorded.

Recording of control programs that are implemented each season will provide information on change in control effort and level of infestation at each site. Ground inspections will continue to monitor the effectiveness of control programs and for any new incursions.

## **Coolatai Grass (*Hyparrhenia hirta*)**

### **Distribution and abundance**

Coolatai Grass is native to Africa and the Mediterranean region. It was introduced to north-west NSW to stabilise soil in the 1940s. It is now known to occur in all states of Australia except Tasmania (Harden 1993).

In NPR, it occurs as restricted infestations in Mount Kaputar NP, Planchonella NR, Bullala NP/SCA, Gunyerwarildi NP and small isolated infestations in Campbell/Montrose AAs and Wongarbron NR (southern entrance).

### **Impacts**

Coolatai Grass is a particularly invasive perennial tussock grass that establishes in dense swards and displaces native ground cover preventing the germination and establishment of trees and shrubs. It spreads well by seeds that readily adhere to animals and vehicles and where the plant becomes established, it will withstand considerable grazing, drought and fire pressures. When it dries off, the biomass of grass creates a higher fuel load than native species, resulting in more intense fires (Hunter 2009). Invasion of native plant communities by exotic perennial grasses is listed as a KTP under the *TSC Act 1995*.

In NPR, the infestation at Wongarbron NR is within Dubbo City Council area where Coolatai Grass has been declared a Class 3 weed under the *Noxious Weeds Act (1993)*. All other infestations occur in Gwydir, Moree Plains and Narrabri Shire Council Areas where Coolatai Grass has been declared a Class 4 weed under the *Noxious Weeds Act (1993)*.

### **Priorities for control**

Wongarbron NR (Inland Grey Box woodland EEC), Gunyerwarildi NP (Box Gum woodland EEC) and Planchonella NR (Semi-evergreen vine thicket EEC) have been identified as priority sites in the BPWW. Coolatai Grass control at these sites are listed as critical priorities for control within the Region. Similarly, the Coolatai Grass infestation in Campbell/Montrose AAs has been identified in vegetation surveys as small clumps in areas of Queensland Bluegrass Grassland. Bluegrass dominated grasslands are listed as endangered in the Brigalow Belt Bioregion under the EPBC Act. For this reason, control of this infestation is also a critical priority.

Coolatai Grass is continuing to spread throughout NPR. Any new infestations that are identified within reserves that were previously free from Coolatai Grass will be treated as a critical priority.

### **Control**

Control can be undertaken via either physical removal or chemical treatment. Physical removal requires pulling out individual tussocks where infestations are small. These should be collected and burnt. Chemical treatment is under permit number PER9792 which allows boom, spot spray or wiper applications.

Both physical removal and herbicide application will be used to control infestations within NPR.

## **Monitoring**

Mapping and recording of control programs that are implemented each season will provide information on change in control effort and extent of infestation at each site. Ground inspections will continue to monitor the effectiveness of control programs and for any new incursions. Where new infestations are detected and treated, follow up checks in subsequent growing seasons will occur to ensure the infestation has been eradicated.

## **Blackberry (*Rubus fruticosus* agg.)**

### **Distribution and abundance**

Different species of Blackberry originate from Europe and America. In Australia, it was promoted for planting as a source of edible fruit, for the control of erosion along creeklines and as a hedge plant. It occurs in all states except the Northern Territory (Parsons & Cuthbertson 1992).

In NPR, it occurs in Warrumbungle NP, Ukerbarley AA & SCA, Pilliga West SCA and Timallallie NP. Several isolated bushes have also been treated in Mount Kaputar NP in recent years.

### **Impacts**

Blackberry is particularly invasive and can cover large areas with dense foliage excluding most native species. It establishes readily in disturbed areas and along creek banks. The dense thickets create impenetrable barriers and provide harbour for pest animals such as feral pigs, foxes and rabbits. When dry, thickets can also present an increased fire hazard. Blackberry fruit is readily consumed by birds and other animals which further promote the spread (Parsons & Cuthbertson 1992).

Blackberry is listed as a Weed of National Significance (WoNS). In NPR, all infestations occur in Castlereagh Macquarie County Council and Narrabri Shire Council areas where Blackberry has been declared a Class 4 weed under the *Noxious Weeds Act (1993)*.

### **Priorities for control**

Hells Hole (Warrumbungle NP – Box Ironbark woodland) and The Duke (Timallallie NP – Box Gum Woodland EEC) have been identified as a priority site in the BPWW. Blackberry control at these sites are listed as critical priorities for control within the Region. In addition, the Blackberry infestation at Ukerbarley SCA/AA is within the Carex sedgeland EEC and has therefore been identified as a critical priority for control.

Blackberry has been treated in other areas of Warrumbungle NP and Pilliga West SCA as an ongoing program for a number of years. As a result of past control efforts, the infestations are limited to several smaller areas at each of these sites. Ongoing control of each of these infestations will be undertaken as a low priority.

### **Control**

Control can be carried out via cut stump, stem injection, cut and scrape or overall spraying. Cut stump, stem injection and cut and scrape methods are best suited to smaller infestations or where overall spraying cannot be used as these methods are very labour intensive. Overall spraying is the most efficient control technique for larger infestations with a number of herbicides registered which cover a variety of

control situations. Generally, control is undertaken between late spring and early autumn when bushes are actively growing. Follow up control is often required.

Several biological control agents also exist for Blackberry. While these inhibit growth and spread, they can not be relied upon for control.

### **Monitoring**

Mapping and recording of control programs that are implemented each season will provide information on change in control effort and extent of infestation at each site. Ground inspections will continue to monitor the effectiveness of control programs and for any new incursions. Where new infestations are detected and treated, follow up checks in subsequent growing seasons will occur to ensure control of the infestation.

## **St Johns Wort (*Hypericum perforatum*)**

### **Distribution and abundance**

St Johns Wort originated in Europe, western Asia and North Africa. How or why it was introduced to Australia is unclear. Currently, it is known to occur in all states except Queensland and Northern Territory, with the largest areas of infestation in Victoria and New South Wales (Parsons & Cuthbertson 1992).

In NPR, it occurs as several isolated infestations in Warrumbungle NP (Beloungery Flats and Yahringerie), an isolated infestation in Ukerbarley SCA/AA and scattered infestations in Timallallie NP (The Duke), Yarrobil NP and Adelyne SCA.

### **Impacts**

St Johns Wort competes with native species for light and nutrients. When infestations become well established it can dominate ground cover removing almost all other species. It is known to be toxic to livestock although it is rarely consumed if other feed is available. Each plant produces a large amount of seed which can be spread by readily sticking to animal fur and wool or in the movement of mud (Parsons and Cuthbertson 1992).

In NPR, all infestations occur in Castlereagh Macquarie County Council and Mid Western Regional Council areas where St Johns Wort has been declared a Class 4 weed under the *Noxious Weeds Act (1993)*.

### **Priorities for control**

The Duke (Timallallie NP – Box Gum Woodland EEC) has been identified as a priority site in the BPWW. St Johns Wort control at this site is listed as a critical priority for control within the Region. Similarly, the St Johns Wort infestation at Ukerbarley SCA/AA is on the margin of the Carex sedgeland EEC and has therefore been identified as a critical priority for control.

At this stage, there is little local knowledge about the infestation of St Johns Wort in Yarrobil NP, with management of this reserve being recently transferred from Mudgee area to Dubbo area of NPWS. However, in the previous Blue Mountains Region Pest Management Strategy, this infestation was identified as a critical priority for control as it was a threat to the threatened species, *Acacia flocktoniae* within the reserve. This priority will continue.

St Johns Wort control in Warrumbungle NP has been an ongoing program for a number of years. As a result of past control efforts, the infestations are limited to several small isolated patches that only require follow up control of plants that are

missed and new germinations. Control of the Warrumbungle NP infestation and the infestation in Adelyne SCA will be undertaken as a low priority.

### **Control**

Control can be carried out either via physical removal or herbicide application. Physical removal requires careful attention to remove the entire plant as regrowth from roots can occur. A number of herbicides are registered for control as an overall spray, thoroughly wetting the plant in the active growth stage during spring and summer.

Both physical removal and herbicide application will be used to control infestations within NPR. Several different registered herbicides may be used.

### **Monitoring**

All infestations within NPR will be mapped and recorded. Recording of control programs that are implemented each season will provide information on change in control effort and level of infestation at each site. Ground inspections will continue to monitor the effectiveness of control programs and for any new incursions.

## **African Boxthorn (*Lycium ferocissimum*)**

### **Distribution and abundance**

African Boxthorn is native to the southern coast of Africa. It was introduced to Australia as a hedge plant and is now one of the country's most widespread weeds being found in all states (Parsons & Cuthbertson 1992).

In the NPR it occurs in varying densities in most reserves in Narrabri and Dubbo Areas. In Coonabarabran and Baradine Areas, it occurs in Macquarie Marshes NR, Pilliga West NP & SCA and Merriwindi SCA.

### **Impacts**

African Boxthorn can grow to 5m high and 3m wide, often growing in dense thickets along watercourses and under trees. It provides ideal habitat for feral pigs, rabbits, foxes and feral cats and it out competes and displaces native vegetation. It spreads mostly as a result of the fruit being eaten by birds and foxes, and excreting viable seeds (Parsons & Cuthbertson 1992).

African Boxthorn is declared a Class 4 weed under the *Noxious Weeds Act (1993)* in all LCAs in the NPR.

### **Priorities for control**

Beresford Park precinct (Mount Kaputar NP – Semi-evergreen Vine thicket), Planchonella NR (Semi-evergreen Vine thicket), Kirramingly NR (Bluegrass EEC), Gunyerwarildi NP (Box Gum Woodland EEC) and Baradine Creek (Pilliga West SCA – Box Gum Woodland EEC) have been identified as a priority sites in the BPWW. African Boxthorn control at these sites are listed as critical priorities for control within the Region.

Control of African Boxthorn has been undertaken in a number of other reserves within the NPR. Further control to maintain the benefits of previous programs has been prioritised in these reserves as a low priority.

## **Control**

African Boxthorn can be controlled via cut stump, basal bark treatment or overall spraying. Cut stump requires cutting the bushes off close to ground level using a chainsaw or brushcutter and immediately applying chemical to the remaining stump.

Basal bark treatment requires chemical mixed with diesel being applied to the full circumference of the trunk or stem of the plant. The mix should be applied from ground level to a height of 30cm.

There are a number of chemicals registered for overall spraying of African Boxthorn. It should be undertaken when bushes are actively growing and have good leaf cover (no leaf fall). Control of African Boxthorn often requires follow up to treat regrowth and/or newly germinated seedlings.

## **Monitoring**

All infestations in critical priority areas will be mapped and recorded. Recording and ongoing mapping of control programs that are implemented each season will provide information on the effectiveness of control as well as increases or decreases in the area of infestations. Ground inspections will continue to monitor the effectiveness of control programs, requirements for follow up control and for any new incursions.

## **Mothers of Millions (*Bryophyllum delagoense* & hybrids)**

### **Distribution and abundance**

Mothers of Millions originated in Madagascar and was introduced to Australia as a garden plant. It is most commonly found in Queensland and New South Wales where it has spread into many rural areas (North West Weeds 2011).

In the NPR it occurs as small isolated infestations in Mount Kaputar NP, Boomi West NR, Boronga NR, Couradda NP, Trinkey SCA, Timallallie NP, Beni SCA and Wongarbron NR. It also occurs in Bobbiwaa SCA, Bullawa Creek SCA and Pilliga West NP & SCA where scattered infestations exist.

### **Impacts**

Mothers of Millions is a drought resistant succulent that grows well on lighter soils. It establishes into dense mats that compete with and displace native species. It reproduces both from seed and vegetatively, with each leaf producing a large number of plantlets. It is toxic to stock, particularly when flowering. It continues to cause deaths in cattle (North West Weeds 2011).

Infestations in NPR occur within Moree Plains, Narrabri and Gunnedah Shire Council areas, as well as Dubbo City Council and Castlereagh Macquarie County Council areas. In all these areas Mothers of Millions has been declared a Class 4 weed under the *Noxious Weeds Act (1993)*.

### **Priorities for control**

Mount Kaputar NP (Beresford Park precinct – Semi-evergreen Vine thicket), Mount Kaputar NP (Ningadoo – riparian vegetation), Bobbiwaa SCA (Carbeen & Myall EEC) and Wongarbron NR (North boundary – Ironbark woodland) have been identified as a priority sites in the BPWW. Mothers of Millions control at these sites are listed as critical priorities for control within the Region.

Control of Mothers of Millions has also been previously undertaken in other areas of Mount Kaputar NP, Couradda NP, Timallallie NP, Pilliga West NP, Pilliga NP & SCA,

Bullawa Creek SCA, Beni SCA and Trinkey SCA. Further control to maintain the benefits of these previous programs has been prioritised as a low priority.

### **Control**

Control can be carried out either via physical removal or herbicide application. Following physical removal, plants must be burnt or kept off the ground, otherwise they will readily regrow. A number of herbicides are registered for control as an overall spray thoroughly wetting the plant. It can be sprayed at any time of the year provided plant condition is suitable. It has bright red flowers during winter-spring, making it easy to identify. Follow up control of new seedlings and missed plants in subsequent growing season is often required.

### **Monitoring**

All infestations that are treated will be mapped and recorded. Recording and ongoing mapping of control programs that are implemented each season will provide information on the effectiveness of control as well as increases or decreases in the area of infestations. Ground inspections will continue to monitor the effectiveness of control programs and for any new incursions within new areas.

## **Spiny Burr Grass (*Cenchrus incertus* & *C. longispinus*)**

### **Distribution and abundance**

Spiny Burr Grass originated in North and Central America. Its early history in Australia is unknown however, it now occurs in most states including South Australia, Victoria, Western Australia, Northern Territory and New South Wales (Parsons & Cuthbertson 1992).

In the NPR it occurs in Budelah NR, Boomi NR, Boomi West NR, Boronga NR, Bobbiwaa SCA, Bullala NP, Irragappa AA, Warrumbungle NP, Pilliga West NP & SCA, Merriwindi SCA, Pilliga East SCA and Cobbora SCA. In all these reserves it is most commonly found on the sandy rises within the reserves.

### **Impacts**

Spiny Burr Grass is an annual grass that grows well on low-fertility, sandy, well drained soils where it competes with and displaces native species. It readily establishes on disturbed sites and each plant can yield up to 1000 seeds. The seeds are encased within burrs containing barbed spines. These burrs readily attach to vehicles, machinery and animals. They contaminate wool and can degrade visitor areas (Parsons & Cuthbertson 1992).

Spiny Burr Grass establishes successfully on the sandy ridges where Carbeen Open Forest EECs exists.

All infestations in the NPR are within Moree Plains Gwydir and Narrabri Shire Councils and Castlereagh Macquarie County Council Areas where this species has been declared a Class 4 weed under the *Noxious Weeds Act (1993)*.

### **Priorities for control**

Budelah NR (Carbeen Open Forest EEC), Boronga NR (Carbeen Open Forest EEC), Boomi West NR (Carbeen Open Forest EEC), Boomi NR (Carbeen Open Forest EEC) and Merriwindi SCA (Box Gum Woodland EEC) have been identified as a priority sites in the BPWW. Spiny Burr Grass control at these sites are listed as critical priorities for control within the Region.

Control of Spiny Burr Grass has also been previously undertaken in Warrumbungle NP and Pilliga West NP. Further control to maintain the benefits of previous programs has been prioritised as a low priority.

### **Control**

Due to the extent of infestations of Spiny Burr Grass, the most efficient and effective method of control is herbicide application. Chemicals available for this are effective but non selective controls. Chemicals should be applied to actively growing plants (late spring – early summer) prior to establishment of seed.

### **Monitoring**

All infestations in critical priority areas will be mapped and recorded. Recording and ongoing mapping of control programs that are implemented each season will provide information on the effectiveness of control as well as increases or decreases in the area of infestations. Ground inspections will continue to monitor the effectiveness of control programs and for any new incursions within new areas and Carbeen Open Forest EECs.

## **Buffel Grass (*Cenchrus ciliaris*)**

### **Distribution and abundance**

Buffel Grass originated in North Africa and the Middle East. It was accidentally introduced into Australia in the 1860's, carried in by camel trains. It has since been widely planted as a pasture grass and a stabiliser to minimise erosion. It now occurs in every mainland state of Australia except Victoria (CSIRO Sustainable Ecosystems).

Buffel Grass is not a declared weed in any part of the NPR. It occurs in a number of reserves, however, the greatest concern is in Budelah Nature Reserve where it is established on a number of the ridges where Carbeen Open Forest Community exists.

### **Impacts**

Buffel Grass is a perennial tussock grass that prefers sandier and sandy loam soils. It readily spreads in semi-arid areas displacing native species and reducing species diversity. It will often out compete other pasture grasses planted with it. In many situations it will dominate to a point that all other species are removed. It spreads well by seed and where it is established, will withstand considerable grazing, drought and fire pressure. When it dries off, it produces a higher fuel load than native species, which has made wildfires more frequent in some areas of northern Australia and has resulted in a reduction in some native shrubs (CSIRO Sustainable Ecosystems).

Spiny Burr Grass establishes successfully on the sandy ridges where Carbeen Open Forest EECs exists. Invasion of native plant communities by exotic perennial grasses is listed as a KTP under the *TSC Act 1995*.

### **Priorities for control**

Budelah NR (Carbeen Open Forest EEC), Boronga NR (Carbeen Open Forest EEC), Boomi West NR (Carbeen Open Forest EEC) and Boomi NR (Carbeen Open Forest EEC) have been identified as a priority sites in the BPWW. Buffel Grass control at these sites are listed as critical priorities for control within the Region.

## Control

Due to the extent of infestations of Buffel Grass, the most efficient and effective method of control is herbicide application. Chemicals available for this are effective but non selective controls. Chemicals should be applied to actively growing plants (late spring – early summer) prior to establishment of seed.

## Monitoring

All weed infestations in areas of Carbeen Open Forest within the NPR will be mapped and recorded. Recording and ongoing mapping of control programs that are implemented each season will provide information on the effectiveness of control as well as increases or decreases in area of infestations. Ground inspections will continue to monitor the effectiveness of control programs and for any new incursions within these EECs.

## Prickly Pears (*Opuntia stricta*, *O. aurantiaca* & *O. tomentosa*)

### Distribution and abundance

A number of Prickly Pears occur within reserves in the NPR including Common Prickly Pear (*Opuntia stricta*), Tiger Pear (*Opuntia aurantiaca*) and Velvet Tree Pear (*Opuntia tomentosa*).

Common Prickly Pear and Velvet Tree Pear were introduced to Australia in the early days of settlement, possibly as ornamental shrubs, hedge plants, fodder crops or food plants for cochineal insects. They now occur widely across Australia, however the most extensive infestations are in Queensland and New South Wales (Parsons & Cuthbertson 1992).

In NPR, Prickly Pear occurs in all reserves and Velvet Tree Pear occurs in most reserves within the Region at varying densities.

The origin of Tiger Pear in Australia is unclear. It was once widely distributed across areas of Queensland and New South Wales, however biological control using cochineal has been effective in reducing this, particularly in Queensland. It also occurs in several isolated areas in Victoria (Parsons and Cuthbertson 1992).

In NPR, Tiger Pear occurs in Midkin NR, Bobbiwaa SCA, Killarney SCA, Bullalla NP & SCA, Boonalla AA, Breealong NP, Pilliga West NP & SCA, Pilliga NP & SCA, Merriwindi SCA and Timallallie NP.

### Impacts

Prickly Pears grow well in both exposed and semi-shaded situations. Before the introduction of biological control agents, Common Prickly Pear was the most serious weed in Australia and capable of growing in most parts of the continent. Patches of Prickly Pears grow densely forming an impenetrable barrier and can provide harbour for pest animals such as rabbits. They can spread short distances when segments and fruit drop to the ground and take root, however, birds passing viable seed, segments being moved after attaching to animals, and human movement of plant parts have caused spread over larger areas (Parsons & Cuthbertson 1992).

Tiger Pear is lower growing than the other species discussed here. Its small segments and large sharp spines readily detach from the plant embedding into passing animals or vehicle tyres. The segments also have barbed bristles that readily penetrate skin causing severe irritation and difficulty in removing (Parsons & Cuthbertson 1992). Tiger Pear is of particular concern in areas where Koalas and

smaller ground dwelling mammals inhabit because of the injury and harm it can cause to such species.

Infestations of Prickly Pears occur within all Local Control Areas (LCAs) across the NPR. These species are declared Class 4 weeds under the *Noxious Weeds Act (1993)* in all these LCAs.

### **Priorities for control**

Prickly Pears (mostly Common Prickly Pear) occur in most areas of EECs in NPR. However, Gamilaroi NR (Ooline EEC), Boronga NR (Carbeen Open Forest EEC), Budelah NR (Carbeen Open Forest & Coolibah Black-Box EECs), Boomi West NR (Carbeen Open Forest EEC), Boomi NR (Carbeen Open Forest EEC), Kirramingly NR (Bluegrass EEC), Planchonella NR (Semi-evergreen Vine thicket EEC), Gunyerwarildi NP (Box Gum woodland EEC), Mount Kaputar NP (Eulah Creek – riparian vegetation), Narran Lake NR (Ramsar wetland), Timallallie NP (Bugaldie Creek - Box Gum Woodland EEC, Pilliga Mouse & Koala), Timallallie NP (The Duke – Box Gum woodland), Pilliga NP (Etoo Creek – Box Gum woodland & Koala), Pilliga SCA (Talluba Creek & Tinegie Creek – Box Gum woodland & Koala), Merriwindi SCA (Box Gum woodland EEC), Yarragin NP (South Yarragin – Box Gum woodland EEC), Pilliga West SCA (Baradine Creek – Box Gum woodland EEC), Willalla AA (Semi-evergreen Vine thicket), Boonalla AA (eastern boundary and area bounded by firetrails – Koala), Goonoo SCA (Inland Grey Box woodland) and Merriwindi SCA (Box Gum Woodland EEC) have been identified as a priority sites in the BPWW. Control of Prickly Pears at these sites are listed as critical priorities for control within the Region.

Control of Prickly Pears has also been previously undertaken in a number of other reserves within the Region. Further control to maintain the benefits of previous programs has been prioritised as a low priority.

### **Control**

Prickly Pears are constantly being impacted by biological control agents including, cochineal and cactoblastis. The impact of these control agents is increased by moving infected pear segments into areas where uninfected plants exists. In addition, chemical control has, and will continue to be used. Generally, chemical control programs via an overall foliar spray is applied when plants are in a healthy condition. Follow up control is often necessary.

### **Monitoring**

All infestations that are treated in critical priority areas will be mapped and recorded. Recording and ongoing mapping of control programs that are implemented each season will provide information on the effectiveness of control as well as increases or decreases in the area of infestations in treated areas.

## **Bathurst & Noogoora Burr (*Xanthium spinosum* & *X. strumarium*)**

### **Distribution and abundance**

Bathurst Burr (*Xanthium spinosum*) and Noogoora Burr (*Xanthium strumarium*) originated in South America and North America respectively. The distribution of both species across Australia is similar, being found predominantly in Queensland, New

South Wales and Victoria, but occurring in all mainland states. Bathurst Burr has also been found in Tasmania (Parsons & Cuthbertson 1992).

In the NPR they occur in patches throughout the Region. The largest infestations occur in the Macquarie Marshes and Narran Lake Nature Reserves and Gwydir Wetlands State Conservation Area after inundation of the wetlands.

### **Impacts**

Noogoora Burr is highly invasive in flood out areas growing in a range of soil types from sandy clay loams to heavy self mulching clays. Masses of seedlings establish after late spring to summer rain, crowding out other species. Bathurst Burr is very similar, growing on high fertility disturbed soils often associated with watercourses, dam banks and floodplains. Both species are vigorous competitors against native species (Parsons & Cuthbertson 1992).

The seeds of both species are encased in burrs covered in spines that readily attached to wool, animal fur, clothing and any fibrous material. They are major contaminants of wool which incurs a reduced price as a result. The burrs also float on water, enabling movement along watercourses (Parsons & Cuthbertson 1992).

Both Noogoora and Bathurst Burr have been declared a Class 4 weed under the *Noxious Weeds Act (1993)* in all LCAs across the NPR.

### **Priorities for control**

Terry Hie Hie AA (Cap & Bonnet Creek – Box Gum Woodland EEC), Budelah NR (Coolibah - Black Box woodland EEC), Planchonella NR (Semi-evergreen Vine Thicket EEC), Narran Lake NR (Ramsar wetland), Timallallie NP (Bugaldie Creek – Box Gum woodland EEC), Pilliga NP (Etoo Creek – Box Gum woodland EEC) and Yarragin NP (South Yarragin – Box Gum woodland EEC) have been identified as a priority sites in the BPWW. Bathurst and Noogoora Burr control at these sites are listed as critical priorities for control within the Region.

Control of Bathurst and Noogoora Burr has also been previously undertaken in a number of other reserves within the Region. Further control to maintain the benefits of previous programs has been prioritised as a low priority.

### **Control**

Noogoora and Bathurst burrs are affected by several insects and fungal diseases. While these may account for controlling some infestations or individual plants they cannot be relied upon for control. Small infestations can be controlled via hoeing and hand removal, however spot spraying using selective broadleaf chemicals will be used on larger infestations within the Region. These species will be controlled prior to seed set in late spring and early summer when they are actively growing.

### **Monitoring**

All infestations that are treated in critical priority areas will be mapped and recorded. Recording and ongoing mapping of control programs that are implemented each season will provide information on the effectiveness of control as well as increases or decreases in the area of infestations in treated areas.

## **Lippia (*Phyla canscesans*)**

### **Distribution and abundance**

Lippia is thought to be native to South America, however, as it has been widely cultivated and is considered naturalised in a number of other areas, its exact origin is not clear (Leigh & Walton 2004). Within Australia it is considered a weed and occurs in Western Australia, New South Wales, Queensland, Victoria and South Australia, and is estimated to infest 5.3 million ha in the Murray Darling Basin alone (Earl 2003).

In the NPR, Lippia occurs as extensive infestations in Macquarie Marshes NR and Gwydir Wetlands SCA. It also occurs as smaller, isolated infestations in Narran Lake, Budelah, Boomi, Boomi West, Boronga, Careunga, Midkin and Kirramingly NRs and Macquarie Marshes SCA.

### **Impacts**

Lippia is a broadleaf perennial herb that grows well on clay soils associated with wetland and floodplain areas. It forms a dense mat-like ground cover with a deep root system that dries out the soil. It is suspected to be allelopathic, thus, suppressing the growth of other plants. These characteristics mean that Lippia significantly increases the potential of erosion and becomes dominant, out competing native species, and greatly reducing biodiversity in riparian areas. Where it establishes, it dramatically reduces stocking capacity, having considerable impact on grazing enterprises. It spreads both vegetatively and via seed primarily moved by floodwater (Earl 2003).

All infestations in the NPR are within the Moree Plains Shire Council and Castlereagh Macquarie County Council Areas. Lippia is declared a Class 4 weed under the Noxious Weeds Act in the Moree Plains Shire Council Area. It is not a declared weed in the Castlereagh Macquarie County Council Area.

### **Priorities for control**

Narran Lake NR (Ramsar wetland) and Budelah NR (Coolibah – Black Box woodland EEC) have been identified as a priority sites in the BPWW. Lippia control at these sites are listed as critical priorities for control within the Region. In addition, Lippia has been identified in vegetation surveys in Kirramingly NR where small patches exist in the Bluegrass EEC. The control of Lippia in this reserve is also a critical priority.

### **Control**

The most effective form of control for Lippia involves a cultivation regime. This is not desirable in any of the reserves in the NPR. Herbicide control is limited in its effectiveness, only suppressing the growth of plants for a short period of time. Multiple applications throughout a season have been more effective in controlling infestations. Selective broadleaf products with 2,4-D Amine (e.g. Amicide 625) as the active constituent are approved for Lippia control under permit PER10917. Using the broadleaf selective product will avoid removing native grass species that will compete with, and help prevent the re-establishment of Lippia in areas controlled.

### **Monitoring**

All infestations that are treated in critical priority areas will be mapped and recorded. Recording and ongoing mapping of control programs that are implemented each season will provide information on the effectiveness of control as well as increases or decreases in the area of infestations in treated areas.

## **Mimosa Bush (*Vachellia farnesiana*)**

### **Distribution and abundance**

Mimosa Bush is native to tropical America but is thought to have been introduced into Australia prior to European settlement (Harden 2002). Within Australia this species is considered naturalised, however, there is some conjecture over this determination. It occurs in New South Wales, Queensland, Northern Territory, South Australia and Western Australia.

In the NPR, Mimosa Bush has been identified as a possible issue in a number of reserves including Kirramingly and Budelah NRs and Gwydir Wetlands SCA. It does occur in a number of other reserves within the Region.

### **Impacts**

Mimosa Bush is a spreading shrub, 1-4m tall that grows well on loam and clay soils. It grows in woodlands, shrublands and grasslands, on open plains and near watercourses. It is invasive, particularly where there is little or no shrub competition, forming dense thickets and displacing native species. It provides ideal habitat for feral pigs, foxes and feral cats and limits the movement of stock. It spreads by seeds which are encased in pods that are palatable to sheep, cattle and some bird species. After consuming the pods these species excrete viable seed (Harden 2002).

In the NPR, Mimosa Bush is listed as an invasive native species in some Catchment Management Authority Areas, in recognition of its invasiveness and possible cause for control by private landholders under native vegetation legislation.

### **Priorities for control**

Weed control at Kirramingly NR and Budelah NR has been identified as a priority in the BPWW to protect Bluegrass EEC.

Trial chemical treatment of Mimosa Bush was undertaken in Kirramingly NR in March 2011. While previous trials had been completed by LCAs and Department of Primary Industries to identify effective chemicals for control, the purposes of the NPWS trial was to determine what would efficiently and effectively control Mimosa Bush while having little effect on other surrounding native species. Prior to the chemical treatment, vegetation surveys were undertaken in the trial areas to gather baseline information. Follow up vegetation surveys are planned to identify the impacts of control. Further control in Kirramingly NR or other reserves will not be undertaken until these evaluations are completed. Dependent upon the outcomes, further control may or may not be implemented.

### **Control**

Mimosa Bush is a difficult plant to control. Chemical treatment has been approved by off-label permit (PER11638 & PER10040) for use as an overall spray and pellet treatment. Triclopyr + picloram (e.g. Access) mixed with diesel is also registered for basal bark application. Plants must be actively growing with good leaf coverage for effective control. This species closes down over winter, making the control window late spring, summer and early autumn, provided there has been sufficient rainfall. Desirable species may be temporarily removed from areas under treated bushes (overall spray and pellet treatment) as a result of the sustained action of residual chemicals. Follow up control of Mimosa Bush is necessary.

### **Monitoring**

All infestations that are treated will be mapped and recorded. Recording and ongoing mapping of control programs that are implemented each season will provide

information on the effectiveness of control as well as increases or decreases in the area of infestations in treated areas.

## **Blue Heliotrope (*Heliotropium amplexicaule*)**

### **Distribution and abundance**

Blue Heliotrope is native to South America. It was originally introduced to Australia as an ornamental and is now widespread in parts of Queensland and New South Wales. It is a coloniser of roadsides, old cultivations and degraded pastures (Parsons and Cuthbertson 1992).

In the NPR, Blue Heliotrope generally occurs on previously cultivated or highly disturbed areas within reserves. It occurs as widespread infestations in the central valley of the Warrumbungle NP and isolated infestations in Biddon SCA, Pilliga East SCA, Timallallie NP, Yarragin NP, Dandry Gorge NP and Goonoo NP & SCA.

### **Impacts**

Blue Heliotrope proliferates aggressively due to high seed output and regeneration from root buds. It out competes and displaces most other species. It is known to cause death in cattle through poisoning and is also poisonous to humans (Parsons and Cuthbertson 1992).

In the NPR, infestations of Blue Heliotrope are within the Narrabri Shire Council, Dubbo City Council and Castlereagh Macquarie County Council areas. Blue Heliotrope is declared a Class 4 weed under the *Noxious Weeds Act (1993)* in all of these areas.

### **Priorities for control**

Weed control along roadsides, campgrounds, picnic areas and other visitor areas in the central valley of Warrumbungle NP has been prioritised as a medium priority. Blue Heliotrope control at this site is included in this priority.

Control of Blue Heliotrope has also been previously undertaken in other reserves within the Region. Further control to maintain the benefits of these previous programs has been prioritised as a low priority.

### **Control**

Physical removal of very small infestations can be undertaken.

Several chemicals are available for control. Using a broad-leaf selective herbicide encourages the recruitment of grasses which act as competition against the re-establishment of Blue Heliotrope and other broadleaf colonising weeds.

Several biological control agents specific to Blue Heliotrope have also been released in Australia. Blue Heliotrope Leaf Feeding Beetle (*Deuterocampta quadrijuga*) was released (10/10/2001) at two sites along Wombelong Creek in the central valley of Warrumbungle NP. To date, its impact on the overall infestation has been minimal.

Revegetation programs have also been undertaken in old cultivation areas within Warrumbungle NP. This was done to speed up succession and establish native species competition to colonising weeds such as Blue Heliotrope and Paterson's Curse.

## **Monitoring**

All infestations that are treated will be mapped and recorded. Recording and ongoing mapping of control programs that are implemented each season will provide information on the effectiveness of control as well as increases or decreases in the area of infestations. Ground inspections will continue to monitor the effectiveness of control programs and for any new incursions within new areas.

## **Bridal Creeper (*Asparagus asparagoides*)**

### **Distribution and abundance**

Bridal Creeper is a native of South Africa. Introduced as an ornamental, it now occurs in Victoria, South Australia, NSW and Western Australia. It grows in warm-temperate to tropical regions and favours fertile, well drained soils, commonly occurring on roadsides, vacant land and disturbed bushland close to habitation (Parsons and Cuthbertson 1992).

In the NPR it is only known to occur as small isolated infestations in Dubbo Area in Beni SCA, Sappa Bulga NP and Wongarbron NR.

### **Impacts**

Bridal Creeper is a climbing perennial herb that grows to 3m high and produces underground tubers and sticky red berries. The movement of tubers from earthworks and birds consuming berries and excreting viable seed are causes of spread. The dense canopy of climbing stems and foliage that it develops out compete other vegetation including native species. The underground tubers become a dense mat that limit root growth of other vegetation and can also prevent seedling establishment (Parsons and Cuthbertson 1992). Invasion and establishment of exotic vines and scramblers is listed as a KTP under the *TSC Act 1995*.

Bridal Creeper is listed as a WoNS. All known incursions within the NPR occur in Dubbo City Council area where it has been declared a Class 4 weed under the *Noxious Weeds Act (1993)*.

### **Priorities for control**

Control of Bridal Creeper has been previously undertaken in reserves in Dubbo Area. Further control to maintain the benefits of previous programs is a low priority.

### **Control**

Physical removal is rarely effective as all tubers must be dug up and destroyed. Several Bridal Creeper specific biological control agents including rust fungus, leaf hopper and leaf beetle have been released in Australia to assist in management of the weed. However for smaller infestations including those in NPR, chemical treatment using either glyphosate or metsulfuron methyl are the best control option. Follow up treatment in subsequent growing season is often required.

## **Monitoring**

All infestations that are treated will be mapped and recorded. Recording and ongoing mapping of control programs that are implemented each season will provide information on the effectiveness of control as well as increases or decreases in the area of infestations. Ground inspections will continue to monitor the effectiveness of control programs and for any new incursions within new areas.

## **Sweet Briar (*Rosa rubiginosa*)**

### **Distribution and abundance**

Sweet Briar originated in Europe and Western Asia. It was originally planted in Australia as an ornamental or hedge plant and now occurs in all states except Northern Territory. It mostly occurs on well drained areas of moderate to high fertility receiving more than 600mm annual rainfall. However, it does tolerate a range of conditions and extend into more arid areas (Parsons and Cuthbertson 1992).

Within the NPR extensive control programs have greatly reduced its distribution and currently it only occurs as isolated infestations along the lower altitude disturbed areas of the Warrumbungle National Park and in Mount Kaputar National Park, most predominantly along the Horton River, Second Water Creek and Horsearm Creek (around Scutt's Hut).

### **Impacts**

Sweet Briar can be a fast spreading weed, particularly in areas where there is little competition. It is most commonly spread by birds and other animals eating the fruit and excreting the seed. In agricultural situations it can cause significant losses to production because of competition with and reduced space for palatable species. In bushland situations it similarly competes with and reduces space for native species. Dense patches provide harbour for pest animals, particularly rabbits and feral pigs (Parsons and Cuthbertson 1992).

Incursions within the NPR occur in Narrabri Shire Council and Castlereagh Macquarie County Council areas. Sweet Briar has been declared a Class 4 weed under the *Noxious Weeds Act (1993)* in both of these areas.

### **Priorities for control**

Extensive control of Sweet Briar has been previously undertaken in both reserves within the Region. Further control to maintain the benefits of these previous programs has been prioritised as a low priority.

### **Control**

Mechanical removal, grazing and/or herbicide application can all be used to aid in the control of Sweet Briar. Within the NPR herbicide via basal bark application, cut stump and overall spray will be used to continue control.

### **Monitoring**

All infestations that are treated will be mapped and recorded. Recording and ongoing mapping of control programs that are implemented each season will provide information on the effectiveness of control as well as increases or decreases in the area of infestations. Ground inspections will continue to monitor the effectiveness of control programs and for any new incursions within new areas.

## **Control of other weeds**

Many other weeds occur in reserves within NPR. These include but are not limited to Bridal Creeper, Golden Dodder, Paterson's Curse, Tree of Heaven, Mintweed, Khaki Weed, Castor Oil Plant, Horehound, Cathead, Cotton Bush and several species of thistle. Control of species such as these has, and will continue to be carried out where they impact upon reserve values such as around campgrounds and visitor

areas. Additionally, control may be carried out in some reserves in conjunction with higher priority control programs that are listed above to control other weed species.

DRAFT

## 8. Pest distribution tables

The following pest distribution tables give an overview of significant pest species for each reserve within the Region. The data is 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. A complete list of all Class 3 and 4 declared weeds for each LCA across the Region is included at Appendix 9.1.

**Table 1: Pest Animal distribution within reserves in the Northern Plains 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

	Feral Pig	Fox	Goat	Rabbit	Wild Dog	Feral Horse	Feral Deer	Cat
<b>NARRABRI AREA</b>								
Mount Kaputar National Park	⊙	⊙	⊙	Ⓡ	Ⓡ		Ⓡ	⊙
Budelah Nature Reserve	○	○		Ⓡ				⊙
Boomi Nature Reserve	⊙	○		Ⓡ				⊙
Boomi West Nature Reserve	⊙	○		Ⓡ				⊙
Boronga Nature Reserve	⊙	○		Ⓡ				⊙
Brigalow Park Nature Reserve	⊙	○						Ⓡ
Brigalow State Conservation Area	⊙	○						Ⓡ
Planchonella Nature Reserve	○	○						⊙
Midkin Nature Reserve	⊙	○		Ⓡ				Ⓡ
Careunga Nature Reserve	⊙	○						Ⓡ
Gamilaroi Nature Reserve	Ⓡ	○						Ⓡ
Kirramingly Nature Reserve	⊙	○	Ⓡ					Ⓡ
Narran Lake Nature Reserve	○	○	⊙	⊙				○
Berrygil Aboriginal Area	⊙	○	Ⓡ					Ⓡ
Bobbiwaa State Conservation Area	⊙	○					Ⓡ	⊙
Bullala National Park	⊙	○			Ⓡ			⊙
Bullala State Conservation Area	⊙	○			Ⓡ			⊙
Bullawa Creek State Con. Area		○						⊙
Campbell Aboriginal Area	⊙	○	Ⓡ					⊙
Couradda National Park	⊙	○					Ⓡ	⊙
Courallie Aboriginal Area	Ⓡ	○						⊙
Deriah Aboriginal Area	⊙	○	⊙		Ⓡ			⊙
Gunyerwarildi National Park	○	○						⊙
Irragappa Aboriginal Area	⊙	○						⊙

	Feral Pig	Fox	Goat	Rabbit	Wild Dog	Feral Horse	Feral Deer	Cat
Killarney State Conservation Area	©	○						©
Leard State Conservation Area	©	○	®				®	©
Mission Aboriginal Area	©	○						©
Moema National Park	©	○					®	©
Montrose Aboriginal Area	©	○	®					©
Terry Hie Hie Aboriginal Area	©	○						©
Barwon Nature Reserve	○	○						©
Barwon State Conservation Area	○	○	®					©
Gwydir Wetlands State Con. Area	○	○						©
Warrambool State Conservation Area	©	○	©					©
<b>COONABARABRAN AREA</b>								
Warrumbungle National Park	©	○	©	®	®			©
Macquarie Marshes Nature Reserve	○	○	©		®			○
Macquarie Marshes State Con. Area	○	○	©		®			○
Weetalibah Nature Reserve	®	○	®				®	©
Binnaway Nature Reserve	®	○			®			©
Pilliga Nature Reserve (southern)	©	○	©	®	®			®
Trinkey State Conservation Area	©	○			®			©
Tinkrameanah National Park	®	○			®			©
Boonalla Aboriginal Area	®	○	©					©
Wondoba State Conservation Area	®	○					®	©
Biddon State Conservation Area	®	○			®		®	©
Somerton National Park	©	○					®	©
Garrawilla National Park	®	○	©					©
Dowe National Park	®	○						©
Ukerbarley Aboriginal Area	©	○	®		®			©
Ukerbarley State Conservation Area	©	○	®		®			©
Cooleburba State Conservation Area		○						©
Rocky Glen National Park	®	○						©
Carrabear Nature Reserve		○						©
Wingadee Nature Reserve		○						©
Gilwarny Nature Reserve		○						©
Ginget Nature Reserve	©	○	©		®			©
<b>BARADINE AREA</b>								
Pilliga Nature Reserve (northern)	©	○	©	®	®			®
Pilliga West National Park	©	○	©		®	©		®

	Feral Pig	Fox	Goat	Rabbit	Wild Dog	Feral Horse	Feral Deer	Cat
Pilliga West State Conservation Area	Ⓢ	○	Ⓢ		Ⓢ	Ⓢ		Ⓢ
Pilliga National Park	Ⓢ	○	Ⓢ		Ⓢ	Ⓢ	Ⓢ	Ⓢ
Pilliga State Conservation Area	Ⓢ	○	Ⓢ		Ⓢ	Ⓢ	Ⓢ	Ⓢ
Merriwindi State Conservation Area	Ⓢ	○	Ⓢ		Ⓢ			Ⓢ
Pilliga East State Conservation Area	Ⓢ	○	Ⓢ	Ⓢ	Ⓢ			Ⓢ
Willala Aboriginal Area	Ⓢ	○	Ⓢ	Ⓢ	Ⓢ			Ⓢ
Timallallie National Park	Ⓢ	○	Ⓢ	Ⓢ	Ⓢ			Ⓢ
Yarragin National Park	Ⓢ	○	Ⓢ		Ⓢ			Ⓢ
Dandry Gorge Aboriginal Area	Ⓢ	○	Ⓢ		Ⓢ			Ⓢ
<b>DUBBO AREA</b>								
Adelyne State Conservation Area		○						Ⓢ
Beni State Conservation Area	Ⓢ	○		Ⓢ				Ⓢ
Breelong National Park	Ⓢ	○		Ⓢ				Ⓢ
Cobbora State Conservation Area		○						Ⓢ
Coolbaggie Nature Reserve	Ⓢ	○		Ⓢ				Ⓢ
Dapper Nature Reserve		○					Ⓢ	Ⓢ
Drillwarrina National Park	Ⓢ	○			Ⓢ			Ⓢ
Goodiman State Conservation Area	Ⓢ	○		Ⓢ	Ⓢ		Ⓢ	Ⓢ
Goonoo National Park	Ⓢ	○	Ⓢ	Ⓢ	Ⓢ		Ⓢ	Ⓢ
Goonoo State Conservation Area	Ⓢ	○	Ⓢ	Ⓢ	Ⓢ		Ⓢ	Ⓢ
Mogriguy National Park	Ⓢ	○		Ⓢ				Ⓢ
Sappa Bulga National Park		○						Ⓢ
Wongarbon Nature Reserve	Ⓢ	○		Ⓢ				Ⓢ
Yarrobil National Park	Ⓢ	○		Ⓢ	Ⓢ		Ⓢ	Ⓢ

**Table 2: Weed distribution within reserves in the Northern Plains Region**

○ Denotes established widespread infestation throughout a reserve

© Denotes scattered infestation throughout a reserve

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

	Green Cestrum	St John's Wort	Blackberry	African Boxthorn	Mothers of Millions	Prickly Pear	Tiger Pear	Tree Pear	Spiny Burr Grass	Blue Heliotrope	Xanthium species	Sweet Briar	Paterson's Curse	Lippia	Coolatai Grass	Tree of Heaven	Bridal Creeper	Wandering Jew
<b>NARRABRI AREA</b>																		
Mount Kaputar National Park	®		®	®	®	○		®			®	®	®		®			
Budelah Nature Reserve						©		®	®		®			®				
Boomi Nature Reserve				®		©		©	®		®			®				
Boomi West Nature Reserve				®	®	©		©	®		®			®				
Borong Nature Reserve				®	®	©		©	®		®			®				
Brigalow Park Nature Reserve				®		©					®							
Brigalow State Conservation Area				®		©					®							
Planchonella Nature Reserve				®		©		©			®				®			
Midkin Nature Reserve				®		©	©	©			®			®				
Careunga Nature Reserve				®		©		©			®			®				
Gamilaroi Nature Reserve						©		©										
Kirramingly Nature Reserve				©		©					©			®				
Narran Lake Nature Reserve						©		©			®			®				

	Green Cestrum	St John's Wort	Blackberry	African Boxthorn	Mothers of Millions	Prickly Pear	Tiger Pear	Tree Pear	Spiny Burr Grass	Blue Heliotrope	Xanthium species	Sweet Briar	Paterson's Curse	Lippia	Coolatai Grass	Tree of Heaven	Bridal Creeper	Wandering Jew
Berrygil Aboriginal Area						©					®							
Bobbiwaa State Conservation Area				®	©	©	©	®	®		®							
Bullala National Park				©		©	©	©	®		®				®			
Bullala State Conservation Area				©		©	©	©			®				®			
Bullawa Creek State Con. Area					©	©												
Campbell Aboriginal Area						©					®				®			
Couradda National Park					®	©		©			®							
Courallie Aboriginal Area						©					®							
Deriah Aboriginal Area						©												
Gunyerwarildi National Park				©		©		©			®				®			
Irragappa Aboriginal Area						©		©	®		®							
Killarney State Conservation Area				©		©	©	©			®							
Leard State Conservation Area				©		©		©			®							
Mission Aboriginal Area						©		©										
Moema National Park				©		©		©			®							
Montrose Aboriginal Area						©		©			®				®			
Terry Hie Hie Aboriginal Area	®					©		©			®							
Barwon Nature Reserve						©					®							
Barwon State Conservation Area						©					®							
Gwydir Wetlands State Con. Area						©					©			©				

	Green Cestrum	St John's Wort	Blackberry	African Boxthorn	Mothers of Millions	Prickly Pear	Tiger Pear	Tree Pear	Spiny Burr Grass	Blue Heliotrope	Xanthium species	Sweet Briar	Paterson's Curse	Lippia	Coolatai Grass	Tree of Heaven	Bridal Creeper	Wandering Jew
Warrambool State Conservation Area				®		©		©										
<b>COONABARABRAN AREA</b>																		
Warrumbungle National Park	®	®	©			©			®	®	®	®	©			®		
Macquarie Marshes Nature Reserve				®		©					○		®	○				
Macquarie Marshes State Con. Area				®		©					○			®				
Weetalibah Nature Reserve						©												
Binnaway Nature Reserve						©												
Pilliga Nature Reserve (southern)						©												
Trinkey State Conservation Area					®	©		®										
Tinkrameannah National Park						©												
Boonalla Aboriginal Area						©	©	®										
Wondoba State Conservation Area						©		®										
Biddon State Conservation Area						©				®								
Somerton National Park						©					©							
Garrawilla National Park						©												
Dowe National Park						©												
Ukerbarley Aboriginal Area		®	®			©										®		
Ukerbarley State Conservation Area		®	®			©										®		
Cooleburba State Conservation Area						©												
Rocky Glen National Park						©												

	Green Cestrum	St John's Wort	Blackberry	African Boxthorn	Mothers of Millions	Prickly Pear	Tiger Pear	Tree Pear	Spiny Burr Grass	Blue Heliotrope	Xanthium species	Sweet Briar	Paterson's Curse	Lippia	Coolatai Grass	Tree of Heaven	Bridal Creeper	Wandering Jew
Carrabear Nature Reserve						©												
Wingadee Nature Reserve						©												
Gilwarry Nature Reserve						©												
Ginget Nature Reserve						©												
<b>BARADINE AREA</b>																		
Pilliga Nature Reserve (northern)						©												
Pilliga West National Park				®	©	©	○	©			®							
Pilliga West State Conservation Area			®	®	©	©	○	©	®		®					®		
Pilliga National Park						©	○											
Pilliga State Conservation Area						©	©											
Merriwindi State Conservation Area				®		©	©	®	®									
Pilliga East State Conservation Area						©		®	®	®								
Willala Aboriginal Area						©												
Timallallie National Park		®	®		®	©	©			®	®		®					
Yarragin National Park						©				®	®		®					
Dandry Gorge Aboriginal Area						©				®								
<b>DUBBO AREA</b>																		
Adelyne State Conservation Area		®		®		©												®
Beni State Conservation Area				©	®	©					®		®				®	
Breelong National Park				©		©	©	©			®							

	Green Cestrum	St John's Wort	Blackberry	African Boxthorn	Mothers of Millions	Prickly Pear	Tiger Pear	Tree Pear	Spiny Burr Grass	Blue Heliotrope	Xanthium species	Sweet Briar	Paterson's Curse	Lippia	Coolatai Grass	Tree of Heaven	Bridal Creeper	Wandering Jew
Cobbora State Conservation Area				®		©			®									
Coolbaggie Nature Reserve						©							®					
Dapper Nature Reserve						©												
Drillwarrina National Park				®		©							®					
Goodiman State Conservation Area						©												
Goonoo National Park				®		©				®	®		®					
Goonoo State Conservation Area				®		©				®	®		®					
Mogriguy National Park				®		©							©					
Sappa Bulga National Park				®		©											®	
Wongarbon Nature Reserve				®	®	©							®		®		®	
Yarrobil National Park		©				©										©		

Note: Xanthium species refers to Bathurst Burr (*Xanthium spinosum*) and/or Noogoora Burr (*Xanthium occidentale*)

Spiny Burr Grass includes *Cenchrus incertus* and *C. longispinus*



## 9. Appendices

### 9.1 Class 3 and Class 4 weeds in all Local Control Authority areas in Northern Plains Region

	Narrabri Shire Council	Moree Plains Shire Council	Gwydir Shire Council	Tamworth Regional Shire Council	Gunnedah Shire Council	Liverpool Plains Shire Council	Castlereagh Macquarie County Council	Dubbo City Council	Wellington Council	Mid Western Regional Council
Columbus Grass	4	4			4	4	3	3	3	3
Coolatai Grass								3	3	3
Green Cestrum	3	3	3	3	3	3	3	3	3	3
Giant Parramatta Grass			3		3	3				
Johnson Grass	4	4			4	4	3	3	3	3
Serrated Tussock	4	4	3	3	4	3	4	4	4	4
Silk Forage Sorghum					4	4	3	3	3	3
Silver-leaf Nightshade	3	3	3	3	3	3	4	4	4	4
St Johns Wort	3	3	3	4	3	3	4	4	4	4
African Boxthorn	4	4	4	4	4	4	4	4	4	4
Arrowhead	4	4	4	4	4	4	4	4	4	4
Bridal Creeper	4	4	4	4	4	4	4	4	4	4
Burr species*	4	4		4	4	4	4	4	4	4
Blackberry	4	4	4	4	4	4	4	4	4	4
Blue Heliotrope	4				4		4	4	4	4
Cape Broom									4	
Chilean Needle Grass	4	4	4	4	4	4	4	4	4	4
Cineraria										4
Devils Claw									4	
East Indian Hygrophila	4	4	4	4	4	4	4	4	4	4
Galenia				4		4				
Golden Dodder	4	4	4		4	4	4	4	4	4
Harrisia Cactus	4	4	4	4	4	4	4	4	4	4
Hemlock	4	4			4					4
Lacy Ragweed										4
Lantana	4	4	4	4	4	4	4	4	4	4
Leafy elodea	4	4	4	4	4	4	4	4	4	4
Lippia	4	4	4	4	4	4	4	4	4	4

	Narrabri Shire Council	Moree Plains Shire Council	Gwydir Shire Council	Tamworth Regional Shire Council	Gunnedah Shire Council	Liverpool Plains Shire Council	Castlereagh Macquarie County Council	Dubbo City Council	Wellington Council	Mid Western Regional Council
Longleaf Willow Primrose	4	4	4	4	4	4	4	4	4	4
Long-style Feather Grass		4			4	4				4
Mintweed		4					4		4	4
Mothers of Millions	4	4	4	4	4	4				
Nodding Thistle			4	4		4	4		4	4
Pampas Grass	4	4	4	4	4	4	4	4	4	4
Paterson's Curse		4	4		4	4				
Perennial Ragweed	4			4	4	4				4
Prairie Ground Cherry									4	4
Prickly Pear species*	4	4	4	4	4	4	4	4	4	4
Privet species			4							4
Rhus Tree	4	4	4	4	4	4	4	4	4	4
Scotch Broom				4		4				4
Thistle species*				4		4				4
Sagittaria			4							
Spiny Burr Grass*	4	4				4	4	4	4	4
Spotted Golden Thistle		4								
Star Thistle						4				
Sweet Briar			4	4		4	4	4	4	4
Tree of Heaven					4			4	4	4
Wild Radish					4					

\* Burr species includes Bathurst / Noogoora / Hunter / South American / Californian / Cockle Burr

\* Prickly Pear species includes *Cylindropuntia* species (including Hudson Pear) and *Opuntia* species

\* Privet species includes Broad-leaf Privet and Narrow-leaf Privet

\* Thistle species includes Scotch, Stemless, Illyrian and Taurian thistles

\* Spiny Burr Grass includes *Cenchrus incertus* and *C. longispinus*

Class 3 listed weeds - The plant must be fully and continuously suppressed and destroyed

Class 4 listed weeds - The growth of the plant must be managed in a manner that reduces its numbers spread and incidence and continuously inhibits its reproduction and/or the plant must not be sold propagated or knowingly distributed

## **9.2 Emerging Pest Issues**

In NPR, there are a number of weeds and pest animals that pose a risk of invasion and/or further spread and establishment. Those listed below are not currently known to exist in reserves, exist in small isolated infestations or are only in a small number of reserves. These species, the locations of current infestations and/or possible reserves where infestations may establish are discussed below.

### **Feral Deer**

Within NPR, current infestations of feral deer are known to occur within Mount Kaputar NP, Bobbiwaa SCA, Couradda NP, Leard SCA, Moema NP, Weetalibah NR, Wondoba SCA, Biddon SCA, Somerton NP, Pilliga NP & SCA, Dapper NR, Goodiman SCA, Goonoo NP & SCA and Yarrobil NP. Both fallow deer and red deer have been identified within the Region.

Feral Deer impact by selective browsing, spreading weeds, wallowing, rubbing trees and other vegetation and causing erosion through scrapes and pads. Their browsing can impact on native vegetation by preventing the establishment of seedlings and reducing seed reproduction of established plants. While some threatened species may be impacted by this selective browsing, it can also lead to changes in vegetation communities with more palatable species being reduced and less palatable species becoming dominant. Furthermore, native animals that rely on native plant species for food or shelter may be impacted through competition with feral deer (Claridge 2010).

Herbivory and environmental degradation caused by feral deer is listed as a KTP under the *TSC Act 1995*.

Currently there are limited effective and efficient control options for feral deer. In NPR they may be opportunistically controlled through ground or aerial shooting programs targeting other pests. There is research currently being undertaken to develop a targeted and efficient control technique. If this develops, control programs using these techniques could assist in feral deer management in the Region.

### **Feral Horses**

Within NPR, current infestations of feral horses are known to occur in Pilliga West NP & SCA and Pilliga NP & SCA. While the exact number of feral horses is unknown, the Pilliga West NP & SCA population is larger (estimated to be less than 50) than the Pilliga NP & SCA population (estimated to be less than 10).

There appears to be strong community ties to the Pilliga West NP & SCA population where the majority of horses are thought to descend from horses that were used historically for snigging logs in the timber industry. There appears to be less community ties with the Pilliga NP & SCA population.

Generally, horse populations can cause both economic and environmental impacts. Economic impacts can include damaging fences and infrastructure such as water points, competing with livestock for pasture and being a potential carrier of exotic diseases. Environmental impacts can include soil erosion from tracks and pads, damage to native vegetation from trampling and browsing and disturbance of water points (Berman et al 1993). While the level of impacts caused by the feral horse populations in the Pilliga is largely not known, there have been some safety concerns resulting from a small number of motor vehicle accidents involving horses.

At this point in time, monitoring programs involving remote camera monitoring and dung counts are being developed to gather more information on individuals,

distribution and activity of these populations. Further monitoring or management will be informed by the outcomes of the impending monitoring program.

### **Aquatic Weeds**

In NPR, aquatic weeds including *Hymenachne* (*Hymenachne amplexicaulis*), *Salvinia* (*Salvinia molesta*), *Water Lettuce* (*Pistia stratiotes*) and *Water Hyacinth* (*Eichhornia crassipes*) have been identified as threats to the Ramsar wetlands in Macquarie Marshes NR, Narran Lake NR and Gwydir Wetlands SCA. There are currently no known infestations of any of these species in any of the wetlands in NPR.

*Hymenachne* is a semi-aquatic perennial grass that has become a major weed of wetlands, flood plains and sugar cane crops of northern Australia. Small infestations have been identified on the North Coast of NSW. It has the potential to spread in northern NSW and become a major weed of wetlands and waterways. It is listed as a WoNS and a Class 1 weed in NSW (NSW Primary Industries 2011).

*Salvinia* is a free floating aquatic fern that grows in still and slow-flowing fresh water. In Australia, it predominantly occurs in streams along the east coast. It has the potential to spread throughout much of Australia where it would impact on waterways and irrigation areas. It is listed as a WoNS and a Class 2 weed in all areas of NPR (NSW Primary Industries 2011).

*Water Lettuce* is a free floating plant that has an appearance like an open head of lettuce. It grows in still and slow-flowing fresh water. In NSW, there have been a number of infestations identified around the northern coastal areas. It has the potential to spread in rivers, wetlands, lakes and streams, especially in areas with a sub-tropical climate. It is listed as a Class 1 weed in NSW (NSW Primary Industries 2011).

*Water Hyacinth* is a free floating perennial water plant that grows in still and slow-flowing fresh water. It occurs along the east coast of Queensland and NSW as well as along the Gingham Watercourse near Moree where it threatens to spread further into the Murray-Darling system. The Gingham Watercourse bifurcates from the Gwydir River. The Gwydir River flows into Gwydir Wetlands SCA. Under favourable conditions infestations can double in mass every 5 days and seeds can remain viable for over 20 years. It is listed as a Class 2 weed in all areas of NPR (NSW Primary Industries 2011).

Rangers and pest management staff involved in management of Macquarie Marshes NR, Narran Lake NR and Gwydir Wetlands SCA are aware of these threats. During routine management activities they will continue to be on the lookout for these species. If any infestations are identified, control programs will be conducted by NPWS and notification of the infestation to the relevant LCA will occur.

### **Hudson Pear**

*Hudson Pear* (*Cylindropuntia rosea*) is a branched cactus with cylindrical stem and segments that are covered in white spines up to 3.5cm long. Its current distribution in NSW is limited to areas around Lightning Ridge, Grawin, Glengarry, Cumborah, Brewarrina, Coonamble and Goodooga. It can grow in a variety of soil types and habitats. Its spines are capable of penetrating footwear and tyres as well as embedding in the skin of humans, native animals, stock and working animals causing severe discomfort. It is easily spread by segments attaching to animals and vehicles which once dropped, readily establish as a new plant. It is a Class 4 weed across NSW (NSW Primary Industries 2011).

Hudson Pear is known to occur on a property adjoining Narran Lake NR and on properties close to Warrambool SCA. NPWS staff have been involved in cooperative control efforts in areas close to Narran Lake NR. Continued vigilance during routine reserve inspections and activities will be used to ensure any infestations are identified and controlled. Identification of any infestation will be reported to the relevant LCA.

### **Prickle Bushes (Mesquite and Parkinsonia)**

Mesquite (*Prosopis sp.* and hybrids) is a prickly bush that occurs in semi-arid areas and could potentially grow across much of Australia. It can be in the form of multi-stemmed shrubby bushes or single-stemmed trees ranging from 3 to 15m in height. It has zigzagged branches with thorns and fern-like leaves. It spreads by seeds that are moved by flood water or consumed by animals including cattle, sheep, pigs, horses, goats, emus and kangaroos and excreted in a viable condition. It is listed as a WoNS and a Class 2 weed across NSW (Department of Natural Resources and Mines 2003).

In NPR, an infestation is known to occur on a property between Pilliga and Coonamble. This infestation is under ongoing control with new germinations occurring annually.

Rangers and pest management staff involved in the management of Pilliga West SCA and NP are aware of this threat. During routine management activities they will continue to be on the lookout for Mesquite. If an infestation is identified, control programs will be conducted by NPWS and notification to the relevant LCA will occur.

Parkinsonia (*Parkinsonia aculeate*) is a prickly bush that is most frequently found around creeks, rivers, bores and dams and on black soil plains. The largest infestations are in northern Australia, with smaller infestations found in NSW and South Australia. It is a many-branched, spreading shrub or small tree, usually between 2 and 8 metres high. Young plants are usually single thorny stems that are hairless and pale to dark green. Parkinsonia is distinguished from other prickly bushes by its tiny oblong leaflets on a flattened leaf stalk, while other species have fern-like leaves. It is spread along waterways in floating seed pods or in mud on machinery, animals or footwear. It is listed as a WoNS and a Class 2 weed across NSW (Department of Natural Resources, Mines and Energy 2004).

In NPR infestations are known to occur on the Barwon River downstream of Mungindi and on the Narran River near Angledool. Much of the Barwon River infestation has been controlled, but further control and follow up is required. The Narran River infestation is thought to be under control, however, ongoing vigilance is required to ensure new germinations do not establish.

Rangers and pest management staff involved in management of Budelah NR (Macintyre River), Narran Lake NR (Narran River), Warrambool SCA (The Big Warrambool) and Barwon NR and SCA (Barwon River) are aware of the threat to these reserves. During routine management activities they will continue to be on the lookout for these species. If any infestations are identified, control programs will be conducted by NPWS and notification of the infestation to the relevant LCA will occur.

### **Parthenium Weed**

Parthenium Weed (*Parthenium hysterophorus*) is an erect annual herb that grows up to 150cm high. It has a hairy, longitudinally grooved stem, pale green leaves and white florets. It can germinate at any time of the year however, the main germination is late spring – early summer following suitable rainfall. Each plant can produce about 15 000 seeds which can be spread short distances by wind or water, or larger distances by animals, vehicles and farm machinery. It generally occurs on heavier fertile soils in disturbed areas such as roadsides, stock camps, previously cultivated or run down areas (Parsons & Cuthbertson 1992). It is listed as a WoNS and a Class 1 weed across NSW.

Large areas of Queensland are infested, however only small isolated infestations occur anywhere else in Australia. In NPR several isolated infestations have been identified along roadsides, mainly on major highways, or on properties where the movement of stock, fodder or machinery from Queensland has introduced seed.

Pest management staff across NPR are aware of the threat and the need to be on the lookout for Parthenium Weed and other new threats. Attention will be paid to roadsides when travelling public roads that pass through reserves. If any infestations are identified, control programs will be conducted by NPWS and notification of the infestation to the relevant LCA will occur.

### **Tropical Soda Apple**

Tropical Soda Apple (*Solanum viarum*) is a prickly perennial shrub up to 2m high. It has cream coloured spines, large leaves, white flowers and fruit that looks similar to small water melons when immature reaching golf ball size and turning yellow as it matures. It was first recorded in Australia in August 2010 in the Kempsey area and several other small infestations have since been identified around Wingham, Coffs Harbour and Grafton (NSW Primary Industries 2011). It is listed as a Class 2 weed across NPR.

Currently there have been no recorded infestations anywhere in NPR. While it appears that this weed would be most suited to a coastal climate, pest management staff across NPR are aware of the threat and will continue to be on the lookout for Tropical Soda Apple and other new threats. If any infestations are identified, control programs will be conducted by NPWS and notification of the infestation to the relevant LCA will occur.

### **Fireweed**

Fireweed (*Senecio madagascariensis*) is a yellow flowered daisy like plant that grows up to 60cm high. Its leaves are 2-7cm long and flowers are 1-2cm in diameter and commonly have 13 petals. Fireweed mostly occurs in coastal areas, however infestations have been recorded on the tablelands. Inland infestations are thought to be less invasive due to the reduced suitability of growing conditions. A native plant with several subspecies (*Senecio pinnatifolius*) is sometimes confused with fireweed. The native species is more widely distributed, occurs in a range of climatic and geographical regions and is not considered a weed (NSW Primary Industries 2011). Fireweed is not a declared weed in any part of NPR.

Currently there are no recorded infestations of Fireweed anywhere in NPR. While it appears that this weed would be most suited to the coastal and tablelands climates, pest management staff across NPR are aware of the threat and will continue to be on the lookout for Fireweed and other new threats. If any infestations are identified, control programs will be conducted by NPWS and notification of the infestation to the relevant LCA will occur.

### 9.3 Key Threatening Processes

Pest animal and weed Key Threatening Processes as listed in Schedule 3 of the *Threatened Species Conservation Act 1995*:

Competition and grazing by the feral European Rabbit, *Oryctolagus cuniculus*

Competition and habitat degradation by Feral Goats, *Capra hircus*

Herbivory and environmental degradation caused by feral deer

Invasion and establishment of exotic vines and scramblers

Invasion and establishment of Scotch Broom (*Cytisus scoparius*)

Invasion and establishment of the Cane Toad (*Bufo marinus*)

Invasion, establishment and spread of Lantana (*Lantana camara*)

Invasion of native plant communities by African Olive *Olea europaea* L. subsp. *cuspidata*

Invasion of native plant communities by *Chrysanthemoides monilifera*

Invasion of native plant communities by exotic perennial grasses

Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants

Predation and hybridisation by Feral Dogs, *Canis lupus familiaris*

Predation by *Gambusia holbrooki* Girard, 1859 (Plague Minnow or Mosquito Fish) (as described in the final determination of the Scientific Committee to list the threatening process)

Predation by the European Red Fox *Vulpes vulpes*

Predation by the Feral Cat *Felis catus*

Predation, habitat degradation, competition and disease transmission by Feral Pigs, *Sus scrofa*

(AustLII 2011)

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