PRELIMINARY DRAFT

NSW National Parks and Wildlife Service

Mid North Coast Region

Pest Management Strategy

2008-2011

Department of Environment & Climate Change NSW

PRELIMINARY DRAFT

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The New South Wales Parks and Wildlife Group (NPWS) is now part of the Department of Environment and Climate Change (DECC). Throughout this strategy, references to “NPWS” should be taken to mean the Parks and Wildlife Group carrying out functions on behalf of the Director General and the Minister of DECC.

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1 Introduction

Pest species are animals (including invertebrates) and plants that have negative environmental, economic and social impacts. In this document they are collectively referred to as pests. Pests are most commonly introduced species, though native species can become pests. In parks, pests may have impacts across the range of park values, including impacts on biodiversity, cultural heritage, catchment and scenic values.

Pests are among the greatest threats to biodiversity throughout Australia. In New South Wales, they have been identified as a threat to 657 of 945 (70%) species, populations and communities listed under the *Threatened Species Conservation Act 1995*; more than any other process except the destruction and disturbance of native vegetation. Minimising the impacts of pests on biodiversity is thus the main objective of NPWS pest management.

Pests can also have significant impacts on economic values of neighbouring lands. The NPWS seeks to address these impacts when setting management priorities and significant resources are committed towards landscape wide pest programs, including wild dogs.

The control of pests outside of parks is the responsibility of private landholders and other agencies such as rural lands protection boards, local councils, the Department of Primary Industries and the Department of Lands. The NSW Invasive Species Plan provides the framework for the coordinated management of weeds and pests that occur over varying land tenure. NPWS is a committed partner to the implementation of this plan.

Many pests are distributed widely across Australia and eradication is not possible in the foreseeable future. They occur in most environments and across all land tenures. Pests often spread quickly and have high reproductive rates, allowing them to re-establish rapidly following control. In recognising that eradication of widespread pests across large areas is an unrealistic goal, NPWS prioritises control effort to focus on areas where outcomes/control are greatest. Resources can then be directed to ensure that the resultant control programs are effective in reducing these impacts. It is the responsibility of all land managers to work together to control pests where significant impacts have been identified.

In New South Wales, the main pest management priorities for the conservation of biodiversity are focussed on threatened species and endangered ecological communities, and are identified in the Threatened Species Priorities Action Statement (PAS), individual threat abatement plans (TAPs) and reserve Plans of Management. Pest programs are also integrated with other park management programs such as fire management.

2 Purpose of the Strategy

The development of Regional Pest Management Strategies (RPMS) provides NPWS with a strategic approach to pest management across NSW. The Strategy developed for each region provides a tool to broadly identify pest distribution and their associated impacts across the park system. It details priorities for each Region, including actions listed in the PAS and TAPs. It also details actions to protect neighbours such as wild dog, pig and site based weed control and allows resources to be allocated to high priority programs. The RPMS also identifies the requirement for other plans or strategies, such as Wild Dog Plans or Bush Regeneration Plans, that provide a more detailed approach.

New pest species continue to establish in the environment either through the importation of new species into Australia or the escape of domestic plants and animals. Prevention and early detection followed by eradication is the most cost-effective way to minimise the impacts of new pests. The NPWS works with other agencies to prevent the introduction of new pests into the wild and to respond rapidly when new incursions occur. The response of NSW

government agencies to new pests will be coordinated through the NSW Invasive Species Plan.

In this strategy, the generic term “parks” is used to refer to any lands managed by NPWS including national park, nature reserve, Aboriginal area, historic site, state conservation area and regional park. This strategy has a four (4) year life span. In the final year of the strategy, it is intended that the strategy will be reviewed and updated.

3 Legislation and Policy

The NPWS has a number of statutory responsibilities in relation to pest management.

National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act 1974* (NPW Act) vests the care, control and management of national parks, nature reserves, historic sites and Aboriginal areas with the Director-General of the NPWS. Key management objectives include conservation, provision of appropriate scientific and educational opportunities, and management of fire and pest species. These are achieved through the preparation and implementation of Plans of Management for each reserve, which identify pest species present, control strategies and priorities for that reserve.

Threatened Species Conservation Act 1995

The *Threatened Species Conservation Act 1995* (TSC Act) lists threatened species, endangered populations and endangered ecological communities. The *TSC Act* also lists key threatening processes (KTPs), which are identified as having significant impacts on the conservation of native flora and fauna. As of August 2006, 18 pests have been listed as KTPs e.g. *Predation by the Red Fox*, *Invasion of Native Plant Communities by Bitou Bush and Boneseed*. The NSW Threatened Species Priorities Action Statement (PAS) outlines the strategies for ameliorating threats listed under the TSC Act including the preparation of threat abatement plans. For each of these strategies the PAS lists one or more detailed actions which aim to protect threatened species by reducing the impact of listed threats.

Rural Lands Protection Act 1998

The pest animal provisions of the *Rural Lands Protection Act 1998* (RLP Act) outline the conditions under which animals, birds and insects are "declared" pests and provides for the control of such pest species. Gazettal of pest species occurs through Pest Control Orders that allow the Minister for Primary Industries to specify pest species on a state wide or local basis and the conditions or factors that apply to the control of each pest. Rabbits, wild dogs and feral pigs have been declared pest animals throughout NSW.

The RLP Act binds the Crown for the control of pest animals declared under the Act. Public land managers such as the NPWS are required to eradicate (continuously suppress and destroy) pest animals "…to the extent necessary to minimise the risk of the pest causing damage to any land" using any lawful method or, if the Order specifies a method to be used, by the method specified.

An approach to balance the conservation of dingoes with the need for wild dog control has been incorporated into the RLP Act through the Pest Control Order for Wild Dogs. This order allows for the general destruction obligation for lands listed in Schedule 2 of the order to be satisfied through wild dog management plans with both control and conservation objectives.

Noxious Weeds Act 1993

The *Noxious Weeds Act 1993* provides for the identification, classification and control of noxious weeds in New South Wales. The Act aims to identify noxious weeds and their

respective control measures, as well as the roles and responsibilities for their control for both public and private land managers/owners.

Amendments to the Noxious Weeds Act in 2005 repealed the NSW *Seeds Act 1982* and introduced a new classification system of weed control classes based on the degree of threat and the distribution of the introduced plant within the state. These new control classes are:

Control Class 1 – State Prohibited Weeds
Control Class 2 – Regionally Prohibited Weeds
Control Class 3 – Regionally Controlled Weeds
Control Class 4 – Locally Controlled Weeds
Control Class 5 – Restricted Plants.
Under this new classification system, Control Classes 1, 2 and 5 noxious weeds are referred to as notifiable weeds.

Pesticides Act 1999

The *Pesticides Act 1999* and the Pesticides Regulation 1995, regulate the use of all pesticides in NSW, after point of sale, and includes specific provisions for record keeping, training and notification of use.

Specific requirements have been included under the Pesticides Regulation in relation the following.

Pesticide Record Keeping: Records must be kept by all people who use pesticides for commercial or occupational purposes such as on farm or as part of their occupation or business. There are also specific record keeping provisions for persons who aerially apply pesticides under both the Act and regulations.

Pesticides Training: People who use pesticides in their business or as part of their occupation must be trained how to use these pesticides. Any person employed or engaged (e.g. volunteers) by NPWS to use pesticides must also be trained.

Pesticide Notification: Notification requirements apply to pesticide applications by public authorities in public places (including NPWS managed park lands). The NPWS Pesticide Use Notification Plan sets out how the Department will notify the community about pesticide applications it makes to public places. (The plan can be located on the NPWS web site).

Pesticide Control Orders are orders that: prohibit or control the use of a pesticide or a class of pesticide, or authorise the use or possession of a restricted pesticide e.g. 1080.

Use of a pesticide must be in accordance with the Control Order where such exists. Current Control Orders can be found at: www.environment.nsw.gov.au/pesticides/pco.htm.

Game and Feral Animal Control (Game) Act 2002

The major aim of the *Game and Feral Animal Control Act 2002* (Game Act) is to promote responsible and orderly hunting of game animals and certain pest animals. The public lands that are covered by this Act do not include any national park estate land.

Other Relevant Legislation

- *Environment Protection and Biodiversity Conservation Act 2000* (Australian)
- *Agricultural and Veterinary Chemicals Code Act 1994*
- *Environmental Planning and Assessment Act 1979*
- *Firearms Act 1996*
- *Heritage Act 1977*
- *Prevention of Cruelty to Animals Act 1979*
- *Occupational Health and Safety Act 2000*

- *Wilderness Act 1987*
- *Protection of the Environment Operations Act 1997*

Park Management Program and Policies

The Park Management Program is a series of guides which are being developed to define the values and objectives for park management and to integrate park policy, planning, operations, monitoring, evaluation and reporting. The aims of the guides are to improve the way we go about park management by:

- providing clear and consistent management objectives and operational procedures, and
- introducing a system to achieve consistent standards in park management and reporting on performance.

The Park Management Program comprises a Policy Guide, a Planning Guide, an Operating Procedures Guide and a Monitoring and Evaluation Guide.

The Policy Guide describes the goals and objectives for park management and the key principles which are applied to guide the achievement of these objectives.

Some specific policies relating to the management of weeds and pest animals are mentioned below.

Policy 2.6 Wild Dogs acknowledges the complexities inherent in the need to conserve native dingoes (and their hybrids) together with the need to control wild dogs.

The NPWS Firearms Management Manual brings together the policy, procedural and technical information required for staff regarding the safety, security and legal procedures for keeping and using firearms. The manual replaced the *NPWS Firearms Policy* and provides policy and procedures for all aspects of firearms use and management including:

- possession and use of firearms by NPWS staff and other approved users,
- firearms administration and record keeping,
- location and storage of firearms,
- planning and risk management for firearms operations,
- maintenance and modification of firearms,
- animal welfare issues related to shooting pest animals and euthanasing native animals, and
- firearms training.

A statewide policy directive requires conservation risk assessments for the application of pesticides on park to ensure that an appropriate level of environmental assessment is carried out prior to application.

Other plans

Other plans that help direct pest management may include Catchment Action Plans for each of the 13 Catchment Management Authorities, regional weed plans, state and national strategies, and reserve Plans of Management.

4 Regional overview

The Mid North Coast Region currently covers the Manning, Hastings and Macleay valleys. The Region extends from Wang Wauk/Nabiac in the south to Stuarts Point in the north and extends inland to the Great Dividing Range. The Region includes the City of Taree, and the major towns of Port Macquarie, Kempsey and Wauchope. The coastal parts of the Region are the most populated and receive heavy visitation, particularly during holiday periods

The Region is divided into three management areas, Manning, Hastings and Macleay. The Region manages 197,600 hectares of lands, including sixteen (16) national parks, ten (10) state conservation areas, two (2) historic sites forty one (41) nature reserves (see Regional Map). Due to accessibility and remoteness, New England National Park is jointly managed from Dorrigo, Carrai National Park and State Conservation Area from Walcha, and Yarriabini National Park and Yarriabini State Conservation Area from Coffs Harbour.

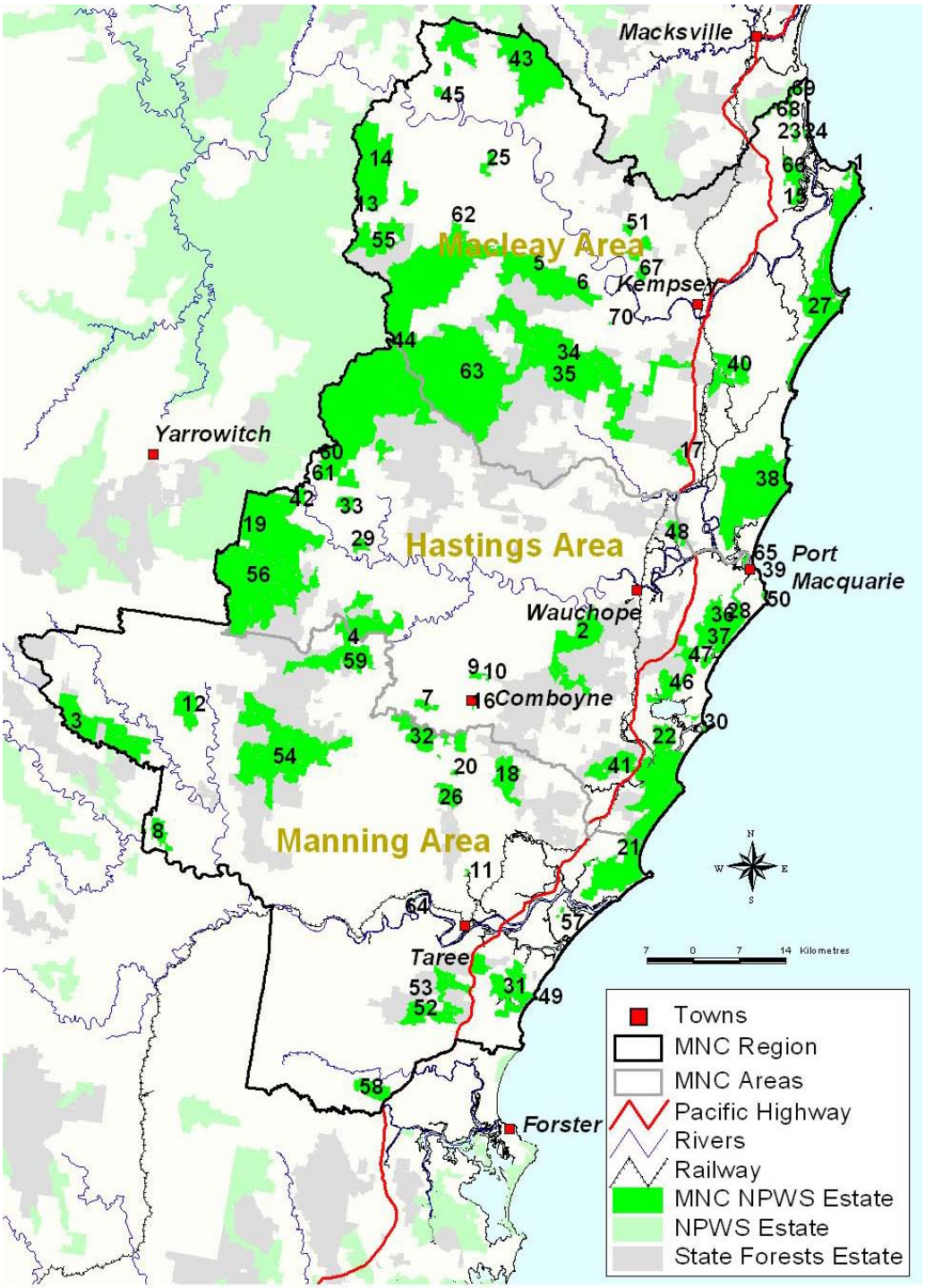
A range of pests occur due to the complex nature of the natural environment. The Region is characterised by major and minor valleys cleared for agricultural purposes with a backdrop of steep ridges and ranges running from the coast to the Great Divide. A wide range of plants and animals have been introduced. In addition to land use changes, the geology, the altitudinal range from the coast to sub-alpine, and the variation in land use including rural, semi-rural, urban and natural areas, all contribute to their being a wide variety of pest management issues.

The number of Regional pest control programs has increased over the past ten years. The Region has worked with neighbours to increase the number of collaborative programs, implemented a number of control programs to protect threatened species, and increased the involvement of community bush regeneration groups in coastal reserves. The involvement of volunteers in coastal reserves has been integral to the success of weed control programs in all coastal reserves. A number of research programs are also being undertaken in collaboration with universities and the Weeds and Invasive Animals Cooperative Research Centres.

The Region also undertakes co-operative aerial and ground vertebrate pest control programs with the Kempsey and Gloucester Rural Lands Protection Boards. The control of wild deer in the mid north coast area has seen the formation of the Mid North Coast Feral Deer Working Group, which now includes the NSW Game Council as one of the critical stakeholders to enable population control. It also implements programs under the Bitou Bush and Fox Threat Abatement Plans for NSW.

Regional Map

DEPARTMENT OF ENVIRONMENT AND CLIMATE CHANGE
PARKS AND WILDLIFE GROUP
Mid North Coast Region



1 Arakoon SCA
2 Bago Bluff NP
3 Barakee NP
4 Biriwal Bulga NP
5 Boonanghi NR
6 Boonanghi SCA
7 Boorganna NR
8 Bretti NR
9 Bridal Veil Falls NR
10 Bridal Veil Falls SCA
11 Brimbin NR
12 Bugan NR
13 * Carrai NP
14 * Carrai SCA
15 Clybucca HS
16 Comboyne NR
17 Cooperabung Creek
18 Coorabakh NP
19 Cottan-Bimbang NP
20 Coxcomb NR
21 Crowdy Bay NP
22 Dooragan NP
23 Fishermans Bend NR
24 Fishermans Bend
25 Gads Sugarloaf NR
26 Goonook NR
27 Hat Head NP
28 Innes Ruins HS
29 Jasper NR
30 Kattang NR
31 Khappinghat NR
32 Killabakh NR
33 Koorebang NR
34 Kumbatine NP
35 Kumbatine SCA
36 Lake Innes NR
37 Lake Innes SCA
38 Limeburners Creek
39 Macquarie NR
40 Maria NP
41 Middle Brother NP
42 Mount Seaview NR
43 New England NP
44 Oxley Wild Rivers NP
45 Pee Dee NR
46 Queens Lake NR
47 Queens Lake SCA
48 Rawdon Creek NR
49 Saltwater NP
50 Sea Acres NR
51 Skillion NR
52 Talawahl NR
53 Talawahl SCA
54 Tapin Tops NP
55 The Castles NR
56 The Cells SCA
57 Towibakh NR
58 Wallamba NR
59 Weelah NR
60 Werrikimbe NP
61 Werrikimbe SCA
62 Willi Willi Caves NR
63 Willi Willi NP
64 Wingham Brush NR
65 Woregore NR
66 Yarrahapinni NP
67 Yarravel NR
68 * Yarriabini NP
69 * Yarriabini SCA
70 Yessabah NR

* denotes partly within MNC Region but managed by another Region

5 Pest Distribution Tables

The following pest distribution tables give an overview of priority 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.

5.1 Pest Animals

5.1.1 HASTINGS AREA

● Denotes established widespread populations throughout a reserve

○ Denotes scattered populations throughout a reserve

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

Reserve	Fox	Feral Cat	Wild Dog	Feral Pig	Feral Cattle	Wild Deer	Feral Goat	Feral Rabbit	Cane Toad	Feral Horses	Koi Carp	Black Rat	Indian Myna	BMAD
Bago Bluff NP	○		○											
Boorganna NR	○		○											
Bridal Veil Falls NR	⊙		⊙											
Bridal Veil Falls SCA	⊙		⊙											
Comboyne NR	⊙		⊙											
Cooperabung Creek NR	○		○											
Cottan-Bimbang NP	○		●											
Crowdy Bay NP	●	○	○				○							
Dooragan NP	○	○	○											
Innes Ruins HS	⊙		⊙		○									
Jasper NR	○		○											
Kattang NR	○	○				○								
Koorebang NR	○		○											
Lake Innes NR	●	○	○	○		○			⊙					
Macquarie NR	⊙	⊙			○						⊙	○		
Middle Brother NP	○		⊙											
Mount Seaview NR	○		●											
Queens Lake NR	○		●			○								
Rawdon Creek NR	○		⊙											
Sea Acres NR	⊙	○										○		
The Cells SCA	⊙													
Werrikimbe NP	○	○	●	○	○	○	○							
Woregore NR	⊙													

5.1.2 MACLEAY AREA

● 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)

Reserve	Fox	Feral Cat	Wild Dog	Feral Pig	Feral Cattle	Wild Deer	Feral Goat	Feral Rabbit	Cane Toad	Feral Horses	Koi Carp	Black Rat	Indian Myna	BMAD
Arakoon SCA	●	○	⊙									⊙		
Boonanghi NR	●		○											
Boonanghi SCA	○		⊙											
Clybucca HS	●		⊙		⊙									
Fifes Knob NR	⊙		⊙											
Fishermans Bend NR	●		⊙											
Fishermans Bend SCA	⊙		⊙											
Gads Sugarloaf NR	⊙		○											
Hat Head NP	●	○	⊙		⊙		○	○						
Kumbatine NP	●		●											
Kumbatine SCA	⊙		⊙											
Limeburners Creek NR	●	○	●	○	⊙		○							
Maria NP	●	○	○											
New England NP														
Pee Dee NR	⊙		⊙											
Skillion NR	●		⊙											
The Castles NR	⊙		⊙											
Willi Willi Caves NR	⊙	⊙	⊙											
Willi Willi NP	○	○	●	○	○		○							
Yarravel NR	●		⊙											
Yessabah NR	⊙	⊙												

5.1.3 MANNING AREA

● 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)

Reserve	Fox	Feral Cat	Wild Dog	Feral Pig	Feral Cattle	Wild Deer	Feral Goat	Feral Rabbit	Cane Toad	Feral Horses	Koi Carp	Black Rat	Indian Myna	BMAD
Barakee NP	⊙		○											
Barrakee SCA	⊙		○											
Biriwal Bulga NP	⊙		○											
Bretti NR	⊙		○											
Brimbin NR	⊙		○											
Bugan NR	○		○											
Coocumbac Island NR														
Coorabakh NP	⊙		○											
Coxcomb NR	⊙		○											
Crowdy Bay NP	●		○				○		○					
Goonook NR	⊙		○					○						
Khappinghat NR	●		○				⊙	○						
Khatambuhl NR	○		○											
Killabakh NR	⊙		○											
Saltwater NP														
Talawahl NR	○		○											
Talawahl SCA	○		○											
Tapin Tops NP	⊙		○											
Towibakh NR	⊙		⊙											
Wallamba NR	○		○											
Weelah NR	⊙		⊙											
Wingham Brush NR		⊙	○											

5.2 Pest Plants

5.2.1 HASTINGS AREA

● 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)

Reserve	Bitou Bush	Lantana	Mysore Thorn	Groundsel Bush	Salvinia	Cabomba	Glory Lily	Bushland Weeds	Rainforest Weeds	Exotic Pine	Exotic Grasses	Exotic Vines
Bago Bluff NP		●										
Boorganna NR		○							○			
Bridal Veil Falls NR		○										
Bridal Veil Falls SCA		○										
Comboyne NR		●										
Cooperabung Creek NR		●										
Cottan-Bimbang NP		●										
Crowdy Bay NP	○	●						○				
Dooragan NP	⊙	●										
Innes Ruins HS		○										
Jasper NR		●										
Kattang NR	○	●						○				
Koorebang NR		●										
Lake Innes NR	○	●			⊙	⊙		○				
Macquarie NR	⊙	●		⊙				○				
Middle Brother NP		●										
Mount Seaview NR		●										
Queens Lake NR	⊙	●										
Rawdon Creek NR		●			⊙							
Sea Acres NR	○	●						○	○			
The Cells SCA		●										
Werrikimbe NP		●										
Woregore NR		⊙										

5.2.2 MACLEAY AREA

● 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)

Reserve	Bitou Bush	Lantana	Mysore Thorn	Groundsel Bush	Salvinia	Cabomba	Glory Lily	Bushland Weeds	Rainforest Weeds	Exotic Pine	Exotic Grasses	Exotic Vines
Arakoon SCA	○	●						○	○			
Boonanghi NR		●							○			
Boonanghi SCA		●										
Clybucca HS		●	○									
Fifes Knob NR		●										
Fishermans Bend NR		●										
Fishermans Bend SCA		●										
Gads Sugarloaf NR		●										
Hat Head NP	○	●	⊙				⊙					
Kumbatine NP		●		⊙								
Kumbatine SCA		●										
Limeburners Creek NR	○	●							○			
Maria NP		●								⊙		
New England NP		●										
Pee Dee NR		●										
Skillion NR		●										
The Castles NR		●										
Willi Willi Caves NR		●							○			
Willi Willi NP		●								⊙		
Yarravel NR		●							○			
Yessabah NR		●							○			

5.2.3 MANNING AREA

● 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)

Reserve	Bitou Bush	Lantana	Mysore Thorn	Groundsel Bush	Salvinia	Cabomba	Glory Lily	Bushland Weeds	Rainforest Weeds	Exotic Pine	Exotic Grasses	Exotic Vines
Barakee NP		●										
Barrakee SCA		●										
Biriwal Bulga NP		●										
Bretti NR		●										
Brimbin NR		●										
Bugan NR		●										
Coocumbac Island NR		●						○				
Coorabakh NP		●										
Coxcomb NR		●										
Crowdy Bay NP	○	●						○				
Goonook NR	○	●										
Khappinghat NR		●										
Khatambuhl NR		●										
Killabakh NR		●										
Saltwater NP		●										
Talawahl NR		●										
Talawahl SCA		●										
Tapin Tops NP		●										
Towibakh NR		●										
Wallamba NR		●										
Weelah NR		●							○			
Wingham Brush NR		●							○			

6 Pest Management Objectives

The overriding objective of NPWS's pest management programs is to minimise adverse impacts of pests on biodiversity and other park values whilst complying with legislative responsibilities.

Programs also aim to:

- manage pest populations to minimise their impact on neighbours,
- increase community understanding of the adverse impacts of pests on biodiversity and Aboriginal and historic cultural heritage, and
- support cooperative approaches and participation in pest management programs with the community and other agencies.

7 Pest Management Principles

Wherever possible, NPWS adopts an integrated approach to pest management, where more than one control technique is used, across the landscape. Integrated pest management is likely to be more effective because it avoids selecting for herbicide resistant weed biotypes or bait-smart/trap-shy animals. Targeting more than one pest species is important as the control of one species may benefit another (e.g. control of foxes may benefit rabbits, control of bitou bush often leads to an increase in other weeds). Also, control is usually undertaken at particular times of the year when pests are most vulnerable (e.g. translocation of herbicides to growing points is usually greater when weeds are flowering).

So that pest management undertaken by the NPWS is carried out effectively and efficiently, the following principles are generally applied.

- Pest control is targeted to species/locations where benefits will be greatest.
- Development of control priorities are set by clearly defining the problem to be addressed e.g. specific impacts are identified so that the purpose of control is clear.
- Where relevant, pest control is collaborative and across tenure, that is, undertaken on a landscape approach.
- Early detection of new incursions and rapid response is considered a high priority as this is the most cost-effective form of pest control.
- Priority is given to mitigating the impacts on biodiversity of a pest that has cultural significance, whilst minimising impacts on cultural values.
- The aim of most pest control programs is to minimise the adverse impacts of pests, as many exotic pests are already widespread (e.g. foxes, blackberries) and for these species eradication is generally not possible, except for isolated occurrencs.
- The focus of control programs is directed towards the values to be protected, because killing pests, by itself, does not necessarily minimise their impacts due to the fact that ecological processes are complex and can be affected by a range of factors.
- Risk assessments are undertaken prior to pest control, where required.
- Pest management strives for a balance between cost efficiency, target specificity and animal welfare.

- Where appropriate, pest control employs a combination of control methods and strategies (integrated pest management).
- Pest control programs usually take a 'holistic' approach, to control all significant pest threats at a site. This will vary according to factors such as appropriate time for control, availability of funding and other control resources.
- Pesticide use complies with relevant legislation and is employed in a manner that minimises impacts on the environment.
- Pest management programs are often integrated with other land management activities such as fire, asset and recreation management.
- Monitoring is implemented, at varying levels, to demonstrate and improve the ongoing effectiveness of control programs.

8 Pest Program Priorities

NPWS prioritises its pest control programs to focus on those areas where the control is the most effective and impacts significantly reduced. The availability of suitable control techniques and resources (both financial and physical), as well as the practicality and cost effectiveness of control, also influence which programs can be implemented.

Where new pest incursions occur, early detection and eradication is the most cost-effective way to minimise the impacts. The NPWS will work with other agencies to prevent the introduction of new pests and to respond rapidly when new incursions occur.

The following key factors are considered when determining priorities for pest management within the Region.

Critical Priority

1. Programs targeting pests which are, or are likely to be, significantly impacting on biodiversity, as largely identified in the NSW Threatened Species Priorities Action Statement (e.g. undertake fox control at the Manning Point priority site for Little terns as identified in the Fox Abatement Plan);
2. 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);
3. Programs targeting pests that impact significantly on agricultural production (e.g. wild dog control where there is potential for significant stock losses as identified in Wild Dog Management Plans; programs to control State Prohibited or Regionally Prohibited Noxious Weeds (Control Class 1 and 2 weeds));
4. Programs addressing new occurrences of highly invasive pest species with potential for significant impacts on park values, subject to risk/feasibility assessment (e.g. riparian vine weeds such as Madiera/Cat's Claw Vines in rainforest communities previously free of these weeds);

High Priority

5. Programs that target pests (other than those covered in priorities above) that impact significantly on World Heritage or international heritage values (e.g. control of lantana impacting on World Heritage values of Werrikimbi NP or affecting karst formations in Willi Willi NP and Yessabah NR);

6. Programs targeting pests that impact significantly on important cultural heritage values (e.g. control of mysore thorn and other weeds within the historic fabric of the Lake Innes ruins, Trial Bay Goal and the Limestone Kilns within Kumbatine NP);

Medium Priority

7. Programs that target pests (other than those covered in priorities above) that impact significantly on Wilderness, Wild Rivers, national heritage values or other important listed values (e.g. control of camphor laurels along a declared Wild River or within a Wilderness area);
8. Programs that target pests that impact significantly on recreation, landscape or aesthetic values (e.g. control of blackberry/lantana on the margins of camping areas; control of weeds in an areas of natural beauty that are visited frequently, such as coastal headlands);
9. Community or cooperative programs targeting pests that impact significantly on park values or agricultural production and that have ongoing, proven effectiveness and participation (e.g. control of winter senna with the assistance of an established community group; control of Regionally Controlled Noxious Weeds (Control Class 3 weeds));
10. Community or cooperative programs that are implemented as part of an endorsed state or regional plan (and not covered above in higher priorities), (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

11. Community programs targeting pests that have localised impacts on natural ecosystems or agricultural lands and that promote community education and involvement with parks (e.g. participation in a new bush regeneration project with a local community group; control of Locally Controlled and Restricted Noxious Weeds (Control Class 4 and 5 weeds));
12. Previous programs targeting pests that have localised impacts on native species and ecosystems, and that can be efficiently implemented to maintain program benefits, (e.g. the maintenance of areas treated previously for serrated tussock to continue keeping them weed free).

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

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

Climate Change

Climate change has been listed as a key threatening process under the *Threatened Species Conservation Act 1995*. Projections of future changes in climate for NSW include higher temperatures, increasing sea levels and water temperatures, elevated

CO_2, more intense but possibly reduced annual average rainfall, increased temperature extremes and higher evaporative demand.

These changes are likely to lead to greater intensity and frequency of fires, more severe droughts, reduced river runoff and water availability, regional flooding, increased erosion and ocean acidification.

The direct impacts of climate change on species and ecosystems may include:

- Range shifts and species movement towards cooler latitudes or higher elevations or in response to changed rainfall frequencies and/or distributions;
- Extinctions of local populations along range boundaries;
- Changes in productivity and nutrient cycling within ecosystems, due to a combination of climate change and increasing carbon dioxide levels;
- Increasing invasion by opportunistic, weedy or highly mobile species, especially into sites where local populations of existing species are declining;
- Increasing threat to freshwater ecosystems through decreasing water flows and changes in water temperature and chemistry; and
- Progressive decoupling of species interactions (for example plants and pollinators).

The greatest detrimental impact is believed to be on the cover and diversity of woody species (Bradstock, 2007). The warm to cool temperate Sclerophyll forests and woodlands typical of this region will see an increased fire risk resulting from more droughts with a decline in shrub species and potentially an increase in invasive grasses (Bradstock, 2007).

Adjusting NPWS management of the environment, through programs to reduce the pressures arising from other threats such as habitat fragmentation, invasive pest species, bushfires, pollution and urban expansion, will help reduce the severity of the effects of climate change.

NPWS will continue with and enhance existing pest and weed management programs to increase the ability of native flora and fauna to cope with future climatic disturbances.

9 Pest Program Recording and Monitoring

Measuring the response of biodiversity (or other values) to pest control is necessary in order to:

- demonstrate the degree of impacts and hence justify priorities for management, and
- measure the effectiveness of ongoing control and direct resources to those programs with the greatest effect.

Measuring the response of biodiversity can be difficult because populations of native species can vary in space and time for many reasons so that differentiating the effects of pest control from other sources of variation is often complex. Where populations cannot be counted directly, measurement is dependent on using indices of abundance. Rigorous attempts to measure population responses need to consider experimental design (e.g. treatment and non-treatment sites, replication, time scale for measurable responses to occur), sampling design (because the entire population can rarely be measured) and standardisation of population measures to allow data to be collated across NPWS (across sites, times and land tenure where appropriate). As a

result, measuring the response to pest control is expensive and can be afforded for only a small sub-set of control programs.

Where native populations are rare, cryptic or dispersed, or where a suite of species is predicted to be affected, indicator species, or other indices of relative abundance, can be used to provide an indirect measure of effectiveness. For example, while fox control may benefit a broad range of ground dwelling mammals, monitoring may focus on a particular "indicator" species which may be easy to capture.

The monitoring of response of pest species distribution and abundance provides an interim measure of effectiveness essential:

- to aid comparison between control effort and biodiversity response;
- to provide useful data where biodiversity, other park values or agricultural responses are too difficult to measure or there is insufficient resources to make proper measurement;
- to provide an interim measure where native species may take some time to respond to pest control.

Where pest incursions have occurred recently, or where their distribution is otherwise limited, the objective of control is usually to eradicate the incursion completely or to contain its spread. In these situations, monitoring is required to confirm eradication or containment and should focus on the pest species rather than the response of native species to control. Such an approach may require methods that are capable of detecting populations at very low densities and prolonged monitoring will be required to ensure that containment or eradication has been achieved.

Where appropriate, monitoring programs should also include measures to verify the results of research being undertaken to gain a better understanding of the interaction between pests and climate change.

Systems and databases are being developed for the consistent and systematic collection, collation, storage and analysis of data as part of the Monitoring and Evaluation component of the Park Management Program.

10 Regional coordination and support of pest control programs

Pest control programs are coordinated by the local NPWS Area and Region in order to ensure that resources are utilised to achieve the best possible outcomes. Area and Regional assistance is also required to efficiently work with neighbours, community groups and other agencies. Education of staff and the broader community are essential requirements in integrated pest management and are best achieved by centralised coordination.

Volunteer community groups provide a valuable role in pest management in eth Region. These groups undertake bush regeneration programs throughout a number of coastal and near coastal reserves in Mid North Coast Region. They involve both community groups and individuals, and include groups such Progress Associations, Dunecare, Point Plomer Malibu Club, Port Macquarie Landcare and the mid North Coast National Parks Association.

These groups have an important positive impact and in some instances have been critical to the current level of achievement in a number of the Region's weed control and bush regeneration grams. Particular inroads have been with coastal vegetation communities through the removal of coastal weed infestations including bitou bush, lantana and cassia. All of the groups work in areas which have been identified as high priority in the Bitou Bush Threat Abatement Plan. Other programs have involved

dedicated groups and individuals working in some of the region's rainforest reserves such as Wingham Brush NR, Coocumbac island NR and Gap Beach in Hat head NP.

Work plans will be developed with these groups to ensure priorities are consistent with Reserve Plans of Management and this Regional Pest Management Strategy. Support will be provided to the groups through the provision of:

- Training - including occupational health and safety, safe herbicide use, weed and native plant identification,
- Equipment – including bush regeneration tools, personal protective equipment, identification manuals, etc, and
- Supervision – an appropriate level of supervision for new member or new groups.

New community groups will be encouraged and supported at sites identified as critical priority as part of the Regional Pest Management Strategy.

11 Pest Program Overviews

Although individual pests are discussed as part of this section, most pest management programs encompass the control of a number of pest species simultaneously. Meeting the objectives of pest control programs is reliant on this approach.

Appendix 1 identifies pest management programs undertaken by each Area, the priority for each program, control strategy summary and key performance indicators.

11.1 Pest Plant Species

11.1.1 Bitou Bush (Chrysanthemoides monilifera spp rotundata)

Distribution and abundance

Bitou bush, native shrub from South Africa, is distributed along the eastern seaboard of Australia, located in coastal areas of Victoria, NSW and QLD. Since becoming naturalised, it has become an aggressive invader of dunal and coastal headland environments. An isolated infestation occurs at Menindee Lakes in western NSW.

In the Mid North Coast region bitou bush is a dominate weed within all NPWS coastal parks and reserves, coastal vacant crown land, private property, local council reserves and state forests. The western spread of bitou is being monitored by the Region, as it has now been recorded several kilometres inland (e.g. western slopes of North Brother Mountain).

Impacts

Bitou bush is a highly aggressive invader which can dominate coastal dune communities and headland vegetation. It continues to be dispersed by native birds and introduced animals such as the fox. Infestations can establish as pure bitou thickets and the dense canopy will often restrict native seedling development. It is considered that decomposing bitou leaves and fruit exudes have allelopathic qualities to inhibit native flora regeneration. It threatens over 180 native plant species, populations and ecological communities in NSW. Bitou bush invades dunes, coastal heathlands, grasslands, woodlands and forests (DEC 2006). Bitou bush can also disturb cultural heritage sites by destroying the fabric of the site. It can provide food and shelter to feral animals, such as the red fox.

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

Bitou bush infestations threaten the conservation values of endangered ecological communities such as littoral rainforests and Themeda grassy headlands.

Although not adequately researched, it is considered that the dominance of bitou bush can alter the composition of native birds in dunal and headland systems, by favouring seed-eaters at the expense of nectar-feeding, heath species.

Priorities for control

- Headland fore dunes and hind dunes of all the Region's coastal reserves

Control

Bitou bush is currently controlled by four (4) methods:

1. Specific control programs involving local community groups.
2. Active spraying control programs by internal management.
3. Aerial spraying (e.g. aerial spray control on headlands where on-ground access is impossible).
4. Release of biological control agents (Bitou Tip Moth, Bitou Seed Fly).

The above shall continue as the control strategies employed by the Region.

Monitoring

Bitou shall be controlled and regeneration monitored within focused areas of the Region's reserves. The Region will continue its current contribution to the release and monitoring of the biological control agents. A Region wide Bitou Bush Pest Management Strategy will be produced. Records of bitou bush control programs are maintained on the Geographic Information System (GIS).

11.1.2 Lantana (Lantana camara)

Distribution and abundance

Lantana, a shrub from North, Central and South America, has a wide distribution across Australia, being a common weed to farming areas, roadsides and gullies. Along the eastern coast of Australia lantana commonly occurs in areas with an average rainfall >750 mm, though is drought-resistant. It occurs from sea level up to an altitude of 2000 meters (WT Parsons and EG Cuthbertson 1992 1990). Both Red and Pink lantana occur along the QLD coast and the mid north coast of NSW, where it favours well drained soils. It also occurs on stony hillsides and in sandy soils, but generally avoids heavy clay soils. Lantana has the widest distribution and highest rate of occurrence across the parks and reserves managed by the Mid North Coast Region. Of particular importance are several of the smaller Nature Reserves such as Yessabah and Willi Willi Caves where it is a pre-dominate weed.

Locally, lantana has historical connections as it was first introduced onto the mid north coast by Major Archibald Innes' wife, who established "well kept hedges" (Mrs Henry Harding Parker, F805) of lantana for the carriageway to the Innes homestead of the 1830's.

Impacts

Lantana is a highly invasive weed, particularly along roadsides, fencelines and areas of previous disturbance. As it becomes established within inaccessible areas control can become very difficult, with large infestations requiring intensive control techniques. Lantana is able to compete effectively against native flora as it has an extensive shallow root system and matures rapidly. Lantana also forms a dense shrub which will shade competing native seedlings, shrubs and grasses. It also provides habitat for pest animal species, and can harbour plant pathogens and agricultural pests such as *Physalospora fusca* and Thrips (*Thrips tabaci*).

Red Lantana, found within the western area of the Region, is toxic to cattle, with loss of appetite, sterility and photosensitisation early symptoms of cattle poisoning.

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

Priorities for control

- Headlands, Historic Sites, Sea Acres Nature Reserve, and camping areas.

Control

Infestations of lantana require intensive removal techniques, utilising herbicides via mechanical applicators. There are a range of registered herbicides which are effective on actively growing plant stems, while others are effective as a basal bark spray application or as a cut stump dressing. Current biological controls being examined by

NSW Agriculture for lantana include rust pathogens (Prospodium tuberculatum and Puccinia lantanae), insects (Aconophona compressa and Aerenicopsis championi), a mite (Aceria sp.) and mirid (Adfalconia sp.) which require further funding to assist these projects. Following funding contributions and scientific testing for each potential control, NSW Agriculture intends to rear and release these biological control agents.

Monitoring

This will include the control of lantana in designated areas and regeneration as required. Improved neighbour relations and reduction or loss of competition vigour in area of bio-control releases are indicators of program success.

11.1.3 Mysore Thorn (Caesalpinia decapetala)

Distribution and abundance

Mysore Thorn is listed by the NSW Noxious Weeds Advisory Committee as being worthy of declaration under the Noxious Weeds Act 1993 due to its prevalence in northern NSW forests, open woodland and rainforests. It also occurs on the Central Coast near Wollongong and near Kiama. In QLD this weed is listed as a major pest species, occurring within the Brisbane, Yeppoon and Toowoomba districts.

Mysore Thorn (also known as Thorny Poinciana), a climbing shrub from Indonesia, has a limited distribution in the Mid North Coast region , with a major infestation that occurred in and around the “Ruins” area of Lake Innes NR. Here it originated as a garden cultivar and ornamental shrub planted by Major Innes’ wife in the 1830’s as part of the Innes Homestead gardens. There are a number of smaller infestations in the Johns River area and near Taree.

Impacts

Mysore Thorn is an invasive thorny climber or shrub adapted to forests, open woodland and rainforest habitats. As a shrub it can establish dense thickets. Its branches are covered with inward facing barbs, which can ensnare native mammals, cattle, horses and goats. It can dominate and out-compete native flora, and threaten the conservation values of areas. It is also recorded as having possible hallucinating/carcinogenic effects.

Although Mysore Thorn at the “Ruins” within Lake Innes NR has historical significance, previous levels of infestation indicate that this weed has overrun gullies and hillsides within the grounds of the “Ruins” and overwhelmed native vegetation. It therefore posed a significant threat to the preservation of the “Ruins” site as also the conservation values of the reserve. It potential to spread to neighbouring lands was also of concern.

Priorities for control

- Innes Ruins Historic Site and any other detected occurrences on NPWS estate within the Region

Control

Mysore Thorn has been the target of an intensive control program within the “Ruins” area since late 1980’s, with subsequent follow-up programs undertaken to trial various techniques.. Mysore Thorn will continue to be contained and/or eradicated within the grounds of the “Ruins”. Because of the historical significance of this species to the area, a sample of the plant may be left in situ near the “Ruins” provided it can be

controlled and will not escape from the site (Lake Innes NR draft Plan of Management 1997)

Monitoring

The infestation has also been surveyed and broken into field plots to monitor recruitment, seedling establishment and control techniques

11.1.4 Groundsel Bush (Baccharis halimifolia)

Distribution and abundance

Groundsel Bush, a small/tall shrub from North America, occurs primarily in warm temperate to sub-tropical climates, establishing primarily within disturbed areas, such as degraded pastures or forests where the understorey is affected by a frequent fire or flood regime. The weed will also readily establish in low lying coastal swamps, semi-tidal and saltmarsh areas that are undisturbed. The southern limit of distribution of Groundsel Bush has recently been recorded on Mitchell Island on the Manning River, near Taree, with its northern distribution limited to coastal areas north to Gladstone in QLD.

Within the Mid North Coast Region individual or small infestations have been recorded in Hat Head NP and Limeburners Creek NR, while the largest infestation is known from Clybucca HS.

Impacts

Groundsel bush is an aggressive invader of disturbed areas and readily invades and proliferates in undisturbed low-lying areas. It has a rapid growth rate and produces vast quantities of windborne seed, which germinates readily. It successfully out-competes and shades native species, prohibiting natural regeneration, and often forms dense thickets that grossly alter the structure and floristic composition of native plant communities (including some SEPP 14 wetlands). Groundsel bush is a declared Class 4 weed under the *Noxious Weeds Act 1993* in the coastal LGAs of Mid North Coast Region. Groundsel bush can readily invade farmland, thereby imposing additional costs for farm management and is toxic to horses.

Groundsel Bush has an ability to colonise both natural and disturbed habitats and form dense thickets which out-compete native understorey species and saplings. It has a long branching taproot and woody stem, making physical control difficult. Its seeds are borne in a long silky pappus, which allows for both wind and water dispersal. Most seeds though fall close to the parent tree, forming dense thickets.

The ability of Groundsel Bush to colonise after fire and flood events can lead to rapid invasion of an area, particularly within paperbark swamps, coastal heath and coastal eucalypt forests.

Groundsel Bush has a wide adaptability to a range of conditions, including pH, a high soil salinity tolerance, temperature and low soil fertility. It potentially can expand across its range, entering both the Tablelands to the west and along the coastal areas south to Newcastle.

Priorities for control

- Continue and expand control programs in Clybucca HS
- Isolated and new occurrences
- Infestations near neighbouring properties
- Large infestations with existing programs where ongoing effort is required to maintain previous benefits.

Control

Groundsel Bush has been the subject of an intensive biological control program and several agents are currently active in the field. These include the gall fly (*Rhopalomyia californica*), a stem boring beetle (*Megacyllene mellyi*) and a stem boring moth (*Oidaematophorus balanotes*). Neither of the latter two species are achieving any effective control at present. The gall fly, released over 10 years ago, which deforms the growing tips reducing seed production, is widespread but its effectiveness is again questionable - it is present in the Clybucca HS infestations.

Groundsel Bush however shall be actively controlled within the three reserves where it currently is located, with the infestation on Clybucca HS to be the focus of a specific control program, not only to protect the conservation values of the site but to also assist neighbouring farming properties to curb the potential level of infestation. Assistance and support for the bio-control agents will continue.

Monitoring

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

Bio-control agents will be monitored and reported as required by NSW Agriculture.

11.1.5 Salvinia (Salvinia molesta)

Distribution and abundance

Salvinia, an aquatic plant from South America has a distribution along the entire eastern seaboard. It is an aquatic weed which floats on the surface or along the muddy edges of still or slow flowing freshwater systems. It is dispersed by flooding events, and an outbreak can, given ideal environmental conditions, become quickly established.

It occurs in Victoria and Tasmania, and around Perth and the Kimberly's of the NT. It grows not only well in populations of its own species, but also with other aquatic weeds. Within the Mid North Coast Region, Salvinia occurs mainly in the lower Macleay River floodplain, with infestations occurring within agricultural drainage networks, in nearby farm dams and within the Swanpool, a freshwater body located in Hat Head NP. Salvinia infestations are also recorded within the Greater Taree City Council area.

Impacts

Infestations in a nutrient rich system can lead to choking of waterways, a decreased light penetration within the water column, a decrease in dissolved oxygen levels and a subsequent higher biological oxygen demand (BOD) as Salvinia decomposes. This can lead to impacts on wildlife, namely wader species, and can cause fish and aquatic invertebrate declines due to the resultant decrease in dissolved oxygen levels. Congested waterways infested with Salvinia and other aquatic weeds are also identified as potential harbours for disease bearing vectors (Saintly and Jacobs 1988), and also affect drinking water quality. This can have implications for humans, native wildlife, and livestock, particularly with the increasing occurrence of such viruses as Ross River Fever.

Salvinia is listed as a noxious weed W2 within all Local Government Areas of the Mid North Coast region, and within wider NSW.

Priorities for control

- Swanpool, Hat Head NP and any other detected occurrences on NPWS estate within the Region

Control

Biological control of Salvinia with the South American Weevil Cytobagus salviniae has been active in the Swanpool with success to date The situation will continue to be monitored and liaison maintained with CSIRO and Kempsey Council. Monitoring of Salvinia and its biological control agent shall be undertaken via both aerial photography and field sampling.

Other control techniques, such as the use of wetting agents which cause Salvinia to sink, are feasible methods of quick control and may be employed by the Region where new, small infestations are located.

As Water Hyacinth also occurs within the Swanpool, both aquatic weeds will require to be managed by NPWS.

Monitoring

The population level of Salvinia shall be monitored regularly, with a decline in the population size to be the objective.

11.1.6 Cabomba (Cabomba caroliniana)

Distribution and abundance

Cabomba is an aquatic plant introduced from south-eastern USA and variously known as Cabomba, Fanwort, Washington Grass or Fish Grass. The known distribution of the genus suggests that it is native to South America and became naturalised in the USA.

It was originally introduced to Australia as an aquarium plant and was first added to the NSW flora in 1986. Five species are currently recognised but only *Cabomba caroliniana* is known to be naturalised in Australia. It is a declared noxious weed in a number of states and is currently a W2 category weed in NSW.

Infestations in Australia are currently known from coastal areas in NT, north-east and south-east QLD, central and northern NSW, a single record from Griffith, NSW and south Gippsland in VIC.

A heavy infestation was recorded from a flood relief drain in Lake Innes Nature Reserve and in 2 subdivision detention basins in Port Macquarie which also drain into the Nature Reserve. This drain in Lake Innes Nature Reserve has been filled to prevent pooling (by Port Macquarie/Hastings Council subject to an approved REF.

Similar to Salvinia, this weed is dispersed by flooding events, and an outbreak can, given ideal environmental conditions, become quickly established.

Impacts

This weed is a serious threat to waterways, will destroy wetland values and cause water quality degradation. It is a major potential threat to Lake Innes NR.

Cabomba is listed as a noxious weed W2 within all Local Government Areas of the Mid North Coast region, and within wider NSW.

Priorities for control

- Lake Innes NR and any detected occurrences on NPWS estate within the Region.

Control

Salvinia and other aquatic weeds, *e.g.* Parrots Feather (*Myriophyllum aquaticum*) also occur with Cabomba around Lake Innes NR. All aquatic weeds will require to be managed simultaneously and there is a strong commitment by both local agencies to contain and/or eradicate this aquatic weed from recorded locations.

There are a number of control measures available which involves chemical and mechanical techniques. Support from community groups will also be encouraged through Council's Urban Bushland Strategy and NPWS bush regeneration volunteers.

Monitoring

Infestations currently mapped and treated shall be monitored regularly by NPWS and Hastings Council, with a containment and/or eradication program as the objective.

11.1.7 Glory lily (Gloriosa superba)

Distribution

Glory lily occurs in dunal areas and headlands with highest densities found in disturbed areas and/or where bitou bush control has been undertaken. At this stage only a small infestation occurs in Hat Head and it has been found adjacent to the southern boundary of Khappinghat NR

Impacts

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

Priorities for Control

- Isolated and new infestations in Hat head NP and other coastal reserves
- Where populations are likely to increase in response to other weed control.

Control

Thorough manual control of isolated plants with few stems is the most effective control option but is of limited practicality for any larger infestations. Herbicide application has shown variable success with the most effective option currently a mixture of glyphosate and metsulfuron methyl (used in accordance with Permit 9907) and applied early in the growing season with a follow up treatment late summer/early autumn. A problem with herbicide application is the potential for off target damage, particularly in heavy infestations, and careful application is needed. Alternate herbicide control options should continue to be investigated.

Monitoring

Existing Infestations are treated as required. New infestations are recorded and are to be treated within that growing season.

11.1.8 Bushland Weeds (various spp.)

Distribution and abundance

Bushland weeds are comprised of a variety of species, often originating as ornamental garden plants disposed as refuse within bushland reserves, or spread by native fauna or by wind and water dispersal. They include:

<u>Woody Weeds:</u>

Cotoneaster *(Cotoneaster species),* Gorse *(Ulex europaeus),* Pepper Tree *(Schinus areira)*, Large-leaved Privet *(Ligustrum lucidium),* Small-leaved Privet *(Ligustrum sinense)*, Tree of Heaven *(Ailanthus altissima),* Sweet Briar *(Rosa rubiginosa)* and Willow species *(Salix species),* Camphor Laurel *(Cinnamomum camphora),* Cassia *(Senna pendula),* Mickey Mouse Plant *(Ochna serrulata),* Pine Tree *(Pinus species),* Polygala *(Polygala myrtifolia),* Umbrella Tree *(Schefflera actinophylla)* and Wild Tobacco Tree *(Solanum mauritianum).*

Exotic Vines and Scramblers:

Cape Ivy *(Delairea odorata),* Madeira Vine (*Anredera cordifolia),* Moth Plant *(Araujia sericifera),* Glory Lily *(Gloriosa superba),* Blue Morning Glory *(Ipomoea indica),* Coastal Morning Glory *(Ipomoea cairica),* Dipogon *(Dipogon lignosus),* Trad *(Tradescantia fluminensis)* and Turkey Rhubarb *(Acetosa sagittata),* Bridal Creeper *(Asparagus asparagoides),* Ground Asparagus *(A. densiflorus)* and Climbing Asparagus (A. plumosus)

Exotic Herbs:

Blue Heliotrope (Heliotropium amplexicaule), Chinese Violet (Asystasia gangetica ssp. micrantha), Mother-of-Millions *(Bryophyllum delagoense),* Noogoora Burr *(Xanthium occidentale),* Nodding Thistle *(Carduus nutans),* Ox-eye Daisy *(Leucanthemum vulgare),* Spear Thistle *(Cirsium vulgare)* and St Johns Wort (Hypericum perforatum), Formosan Lily *(Lilium formosanum).*

Exotic Grasses:

Buffalo Grass *(Stenotaphrum secundatum),* Chilean Needlegrass *(Nassella nemesia)*, Coolatai Grass (Hyparrhenia hirta), Giant Parramatta *Grass (Sporobolus fertilis)*, Panic Veldtgrass *(Ehrharta erecta),* Pampas Grass *(Cortaderia jubata*), Paspalum (Paspalum dilatatum), Spiny Burr Grass *(Cenchrus echinatus),* Whiskey Grass *(Andropogon virginicus)* and Yorkshire Fog *(Holcus lanatus)*

In the Mid North Coast Region bushland weeds are generally relevant to the smaller reserves which have an interface with the urban or asset protection zones involving infrastructure such as historic buildings or near development areas such as campgrounds. . Reserves involved include Sea Acres, Hat Head and Saltwater NP's, and Wingham Brush, Coocumbac Island, Kattang, Yessabah and Macquarie NR's They also occur however in areas of disturbance within larger parks and reserves due to proximity with agricultural situations, but also due to established camping areas prior to park/reserve dedication such as Crowdy Bay, Hat Head and Willi Willi NP's.

Impacts

Bushland weeds as a collective group constitute a serious environmental threat to the conservation of the Region's parks and reserves, particularly within the smaller reserves bordered by urban areas

The impacts of bushland weeds can be exacerbated by the introduction and establishment of major weed species such as lantana and bitou bush. Dense thickets can form as bitou and lantana grow over the established bushland weeds. Additionally, some bushland weeds as creepers and vines, are capable of reaching into the canopy layer and into 'swamp' bushland reserves.

Priorities for control

- Bushland weeds are targeted where biodiversity values are impacted, but also in areas of high public profile with educational programs.

- This especially applies to the smaller remnant reserves that have high visitation. These includes those reserves mentioned above where some programs have been in place for 25 year or more. (e.g. Diamond Head in Crowdy Bay NP and Wingham Brush NR).

Control

Public education programs shall be developed which will involve reserve neighbours to encourage the proper disposal and/or compost of garden refuse, and to alert neighbours to the environmental impacts posed by bushland weeds.

Where needed and where there is a strong enough community support, community action groups, such as the "Friends of Kattang NR", shall be formed with NPWS assistance and staff involvement to initiate bushland weed eradication/control programs.

Monitoring

This will include the mapping and recording of weeds (both noxious and environmental). Also control and eradication programs will be recorded, this including voluntary participation and external grants to assist these programs e.g. Coastcare grants for Point Perpendicular (Kattang NR) and Gap Beach (Hat Head NP).

11.1.9 Rainforest Weeds (various spp)

Distribution and abundance

Rainforest weeds are comprised of a variety of species which have often originated as ornamental 'escapees' and spread by either accidental or intentional dumping of refuse, or via dispersal through native fauna, wind and water. They appear, in the majority, to originate from South Africa or South America. The *exotic* vines are particularly adapted and vigorous weeds to deal with in these reserves. Weeds in this category are management issues within a number of reserves statewide, but particularly in northern NSW.

In the Mid North Coast Region major weeds problems effecting rainforest reserves occur in Sea Acres, Yessabah and Coocumbac Island NR's and at Gap Beach (Hat Head NP). Rainforest weeds are controlled as part of regeneration projects within these reserves.

Impacts

Rainforest weeds, particularly those adapted to establishing rapidly within areas of disturbance, can seriously threaten the conservation values of rainforest reserves. Rapid climbers and vines can quickly swamp a rainforest canopy, and lead to a high competition between native rainforest species. Certain rainforest weeds in particular, such as the Umbrella Tree, can be spread via native birds into rainforest areas and establish within staghorns and elkhorns, robbing these of nutrients and ultimately encasing the host tree as an exotic version of the *strangler fig*.

Priorities for control

- Gap Beach (Hat Head NP), Sea Acres NR, Kattang NR Coocumbac Island NR Yessabah NR, and Wingham Brush NR.
- Rainforest regeneration will be extended to cover other reserves.
- Rainforest regeneration projects conducted within the Region have proved effective in controlling rainforest weeds, and will continue to be the focus of control programs in the future.

Control

Rainforest weeds are a serious threat to the conservation of remnant rainforest reserves. Programs to restore and regenerate these reserves have been in existence for close to 20 years and efforts have pioneered relevant strategies. in order to correctly monitor progress and techniques employed.

Monitoring

Existing programs will continue to be monitored by worksheets of activities undertaken and these ultimately summarised. Photographic evidence of before and after effects is a major tool in the monitoring process. Educational and promotional programs will continue as part of the Region's focus on rainforest protection - in the Manning River valley have been a major emphasis in this respect.

11.1.10 Exotic Pines (Pinus spp.)

Distribution and abundance

There are two separate exotic pine populations within the Mid North Coast region's parks and reserves, one being within Crowdy Bay NP and the second population consisting of three small plantations within Willi Willi NP. The former were post sand mining regeneration plantings to trial their growth. This has been the subject of Ph.D research program through the UNE (*see Broese van Groenou (1996) in references)*. The latter plantations were part of the Forests NSW trials of the 1960's, which aimed to examine the growth rates and viability of pine plantations within a range of climate and environmental areas.

Impacts

The exotic pines of Crowdy Bay NP are now spreading and hence of concern. Those plots located within Willi Willi NP may have the potential to spread within the park, however several of the pine species within the Banda Banda Arboretum have international significance as wild endemic populations of these species have been greatly affected by various disturbances in their country of origin. Opportunistic consultation with the Kew gardens conifer specialist (UK) indicates minimal spread can be expected, but one species needs to be monitored

Priorities for control

- The exotic pine plantation within Crowdy Bay NP is outlined as an objective of the Plan of Management for the park and is currently being removed.
- The exotic pine plantations within Willi Willi NP shall be monitored for possible spread. Given that these plots were established 40 - 50 years ago, there appears little likehood of their spread into other areas of the park.

Control

Due to their historic and international significance, an interpretative walk is proposed in the Banda Banda Arboretum following the area's overlapping declaration as a World Heritage area.

Monitoring

Crowdy Bay NP will be monitored for regrowth.

Monitoring of the exotic pine plantations within Willi Willi NP to safeguard spread into adjoining areas of the Park and World Heritage area.

11.1.11 Exotic Grasses (various spp.)

- Giant Paspalum (*Paspalum urvillei*)
- Giant Parramatta Grass (*Sporobolus fertilis*)
- Spiny Burrgrass (non native *Cenchrus* spp.)
- Pigeon Grasses (*Setaria* spp.)
- Kikuyu (*Pennisetum clandestinum*)
- Whisky Grass (*Andropogon virginicus*)
- Broad-leafed Paspalum (*Paspalum wettsteinii*)
- Coolatai Grass (*Hyparrhenia hirta*)
- Buffalo Grass (*Stenotaphrum secundatum*)
- Molasses Grass (*Melinis minutiflora*)
- Afican Lovegrass (*Eragrostis* curvula)
- Pampass Grass (*Cortaderia sellona*)
- Elephant Grass (*Arundo donax*

Distribution and abundance

Infestations of most exotic grass species occur along roads, tracks and trails and previously disturbed areas within many reserves of the Mid North Coast Region. Giant Parramatta Grass is present almost exclusively along roadsides, often growing in dense swards in Clybucca HS and Limeburners creek NR. Kikuyu and Buffalo Grass is present on headlands in Hat Head NP, Saltwater NP and Sea Acres NR. Infestations of Whisky Grass occur along roadsides in a number of reserves, but a larger infestations occurs in Crowdy Bay NP where sand mining operations occurred adjacent to previous agricultural lands. Broad-leafed Paspalum is an emerging problem in smaller lowland reserves and Coolatai grass has recently been detected along roadsides at a number of sites within Mid North Coast Region.

Molasses Grass is present in infestations in disturbed areas in Crowdy Bay NP, and scattered infestations in Saltwater NP. In addition there are often localised infestations of other grasses such as Elephant Grass - Coocumbac Island NR, Giant Paspalum and Carpet Grass in other reserves.

A number of temperate climate grasses such as African Lovegrass occur along roadsides in various parks and reserves, while Pampas Grass has been found on the rainforest edge in Sea Acres NR and wetlands in Crowdy Bay NP. A recent infestation of Coolatai Grass has been discovered along the walking track at green island point in hat head NP.

Impacts

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

Broad leafed paspalum is becoming invasive, dominating ground cover layers in full sun to shade. Buffalo grass can carpet the ground in the saltmarsh/swamp oak and grassy headland EECs. Whisky grass is a threat to swamp sclerophyll forest and heaths/sedgleands. Coolatai grass has proven very invasive in open woodlands on

the slopes and tablelands and is a threat to heath lands, especially graminoid clay heaths on headlands.

Priorities for Control

- Endangered ecological communities littoral rainforest and grassy
- Isolated and new infestations in all reserves
- Where control of grasses are required as part of a bush regeneration program

Control of large long standing infestations of exotic grasses is best addressed through preparation of a pest management plan. In the interim, the appropriate management of fire to allow for the recovery of native shrubland/forest is currently the only realistic control technique.

Control

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

Monitoring

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

11.1.12 Exotic Vines (various spp.)

- Cats Claw Creeper (*Macfadyena unguis-cati*)
- Madeira Vine (*Anredera cordifolia*)
- Introduced Morning glory (*Ipomoea* spp.)
- Balloon Vine (*Cardiospermum grandiflorum*)
- Moth vine (*Araujia sericifera*)
- Asparagus ferns (*Asparagus* spp.)
- Japanese Honeysuckle (*Lonicera japonica*)

Distribution and abundance

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

Cats Claw Creeper, Madeira and balloon vines are widespread within the Macleay, Hastings and Manning catchments, infesting extensive areas of all river systems, as well as many tributaries. Ongoing control programs are current in all 3 valleys, as well as targeted programs at Wingham Brush and Coocumbac Island NR's. Elsewhere in the region it has an isolated occurrence and any infestations are a high priority for control, particularly around old settlements and historic buildings.

Asparagus spp. are common garden escapes that readily invade many coastal reserves. Significant climbing asparagus (*A. plumosus*) infestations are continuing to be controlled in Wingham Brush and Sea Acres NR's, and Saltwater NP.

Japanese Honeysuckle can be a significant weed in reserves within urban environments or around historic building sites such as Smoky Cape Lighthouse in hat head NP, Roto House in Macquarie NR and Innes Ruins in Lake Innes NR. Moth vine has an isolated occurrence in some coastal reserves generally associated with rainforest communities.

Impacts

Vine weeds have been ranked by the NSW Mid North Coast Weeds Advisory Committee as having the most impact on biodiversity of all weeds species present in

the region. Vine weeds are easily transported, grow quickly and many are capable of climbing to the top of trees and stripping branches due to their weight. This leads to mass germination of vine weeds and other weeds with the increased sunlight reaching the forest floor and hence the destruction of floristic and structural diversity and fauna habitat. Heavy infestations result in trees being transformed to poles, often falling down in future flood events.

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

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

Priorities for control

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

Control

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

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

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

Monitoring

Vine weed infestations need to be controlled at least 3 times per year to ensure that native regeneration is not adversely affected, and for madeira / balloon vine, that tubers / seed pods are not produced within that time. Isolated infestations are controlled immediately where possible, however it is important that their location is mapped to ensure adequate follow up control occurs.

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

Pest Animal Species

11.1.13 European Fox (Vulpes vulpes)

Distribution and abundance

The fox has a wide distribution across Australia, found within a variety of habitats including rainforest, sandy deserts and within urban remnant bushland reserves. It is absent from the tropical areas of northern Australia, and Tasmania

The fox is well established in the Mid North Coast Region, is known or considered likely to occur in all parks and reserves. This species also has a wide distribution within the various State forests, Crown lands and private properties. Fox populations occur in high numbers along the urban/semi rural fringes of major towns.

Impacts

Foxes predate on a range of native fauna, particularly small mammals and native birds. They are opportunistic feeders, feeding on berries and insects and well as scavenging on carrion. Foxes in particular are considered to predate on endangered or locally rare species such as rock wallabies, Brush-tailed Bettong and Numbat. Foxes are also linked to the spread of bitou bush seeds, as the seeds appear to contain addictive substances to foxes and remain viable when digested.

Predation by foxes was the first *key threatening process* to be listed under the NSW *Threatened Species Conservation Act*.

Priorities for control

- Harrington beach spit and Woregore NR have been identified as priority sites in the NSW Fox Threat Abatement Plan targeting Little terns, Beach Thick-knee and other migratory wading birds.

There are no other priorities for fox control on DECC estate within the Mid North Coast Region.

Control

Baiting programs with 1080 (Foxoff commercial preparation) are currently the most effective management strategy for fox control. To protect the Little Tern colony baiting for fox and cats is undertaken prior to the commencement of the Little Tern breeding season. Subsequent baiting also undertaken with further evidence of fox activity on the Harrington Spit.

REF's are prepared for any major baiting programs due to the potential impact on native species. Baiting will involve "mound bait stations" - these allow monitoring of target and non-target species.

Due to the strong scavenging nature of foxes, garbage depots within camping and rest areas shall be managed to prevent or reduce the likelihood of fox scavenging. Traps will continue to be loaned to the public for control of foxes within urban areas.

Monitoring

Egg numbers to fledglings stage maximised in the Harrington Little Tern breeding colony. Baits taken monitored to determine success rate. Neighbour reports reduced and goodwill support from the community and media. Fox and other medium-sized mammal populations are being measured via track counts on sandpads in the wild dog control program. Data is analysed and published periodically as part of the review of the Fox Threat Abatement Plan.

11.1.14 *Feral Cat (Felix domesticus)*

Distribution and abundance

The feral cat is widely distributed across Australia, being recorded within rainforests, dry eucalypt forests, woodlands and in the sandy deserts of the interior.

Within the Mid North Coast Region the feral cat is considered likely to occur, or is known to occur, within nearly all reserves managed by the Region. This assessment includes the distribution of urbanised domestic cats which occur within the smaller reserves such as Macquarie Nature Reserve, and which constitute a threat to the native fauna of these reserves.

Impacts

Predation by feral cats has been listed as a Key Threatening Process under the NSW TSC Act and the Commonwealth EPBC Act. Feral cats predate on a range of small native fauna, including mammals, marsupials, birds, reptiles, amphibians and invertebrates. 'Kills' by these animals are not always for food, particularly with domestic cats, as they possess a strong hunting instinct.

They also act as a reservoir for infectious diseases such as toxoplasmosis which can affect the central nervous and respiratory systems causing blindness in humans and native fauna. The *sarcosporidiosis* bacteria carried in cat saliva can lead to infection, and bites can be fatal to native fauna and stock.

Feral cats are implicated with difficulties experienced with programs for the re-introduction of endangered species (e.g. the Bilby and Rufous Hare-wallaby), though the full impact on native fauna has yet to be intensively researched.

Priorities for control

- Trapping of cats within small bushland reserves such as Macquarie, Sea Acres and Kattang Nature Reserves will be undertaken where such problems are observed/reported by NPWS staff or members of the public.

Control

Cats appear to be difficult to bait or trap and these methods are best suited to situations where individuals or small numbers occur within a specific area.

Biological control of feral cats is under research by national bodies such as CSIRO, the Australian Animal Health Laboratory in Victoria and universities. Both the 'cat-flu' virus and feline herpes virus are considered as likely prospects for biological control.

A number of control techniques and a list of high priority locations for control are currently being compiled as part of the production of the NSW Threat Abatement Plan for predation by feral cats.

Community education programs will address the impact of the feral cat on native fauna and the impact that domestic cats can have on the smaller reserves managed by the PMD. The name/address of cat owners in urban areas bordering parks and reserves through the Neighbour Relation database will be updated so that cats trapped can be return to owners, or if unidentifiable, euthanased.

Due to the strong scavenging nature of cats, garbage depots within camping and rest areas shall be managed to reduce the likelihood of cat scavenging.

Monitoring

Numbers of feral cats/neighbour reports reduced. Media coverage and educational programs to be pursued. Database to be upgraded to include neighbours with domestic cats. Educational pamphlet to be produced.

11.1.15 Wild Dog (Canis familiaris)

Distribution and abundance

Wild dogs can be divided into three groups. Dingoes, which arrived in Australia about 4000 years ago, Feral dogs – domestic dogs living in the wild, and hybrids - the result of cross-breeding between dingoes and feral dogs. Wild dogs have a distribution across Australia, particularly in 'satellite' areas to major towns, rural settlements and outlying properties.

Dingoes originally occurred throughout NSW but today populations of wild dogs, including dingoes occur mainly in the east of the state on public and private lands along the Great Dividing Range and coastal hinterlands.

Wild dogs are present in low to medium densities most of the larger reserves in the Mid North Coast Region, particularly abutting the rural landscape. Many of these reserves are identified Dingo Management Areas under Schedule 2 of the RLPB Wild Dog Pest Control Order. Pest Animal Distribution Tables in this strategy provide a full list of reserves where wild dogs are known to occur within the Region.

An assessment of wild dog DNA samples (total 247) collected throughout the NPWS Northern Branch indicate that more than 70% of the entire wild dog population are dingoes (varying from 100% to 50% pure). Pure dingoes comprised approximately 20% and feral dogs only 8% of the general wild dog population.

DNA analysis of wild dog populations in North Coast Region to the north show a significant proportion of wild dogs in the larger reserves of New England NP and Cathedral Rock NP are either pure or greater than 75% pure dingo. A core population of pure dogs continues to breed in the Limeburners Creek NR, while pure dingoes have been recorded in various locations in Mid North Coast region across the landscape. Conservation of dingoes in an environment where they are also a declared pest species is a significant challenge.

Impacts

Wild dogs, including dingoes, can cause significant livestock losses to the pastoral industry. Livestock affected include goat, sheep and cattle. Significant impacts occur where forested and gorge areas interface with fine wool sheep country. Impacts on cattle operations are most pronounced during calving.

Breeding between dingoes and feral dogs is one of the biggest threats to remaining native dingo populations. Maintenance of dingo pack structure within identified Dingo Management Areas (Schedule 2 lands) is seen as important to minimize further hybridisation and reduce predation impacts on neighbouring livestock operations. Wild dogs have the potential to suppress populations of pest species such as feral goats, pigs and foxes.

Dingo habituation and aggression towards park visitors has been identified as a potential risk in popular camp grounds in Limeburners Creek NR, Crowdy Bay and Hat Head NP's.

Wild dogs, including dingoes, are declared as a pest animal throughout NSW under the Rural Lands Protection Board Act. NPWS seeks to find a balance between conserving dingoes and controlling dingoes and other wild dogs in areas where they impact on livestock.

Control

A fully integrated suite of control techniques will be used to manage wild dogs within the Mid North Coast Region. Control programs are undertaken in partnership with the local RLPB, WDCA and individual landholders. Strategic (proactive) control options, aimed at minimising the impact of wild dogs on livestock operations include:

- Ground/mound baiting and trapping in accessible areas
- Aerial baiting in the rugged inaccessible areas where other control techniques may not be suitable
- Trapping using either DECC staff or contract trappers

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

- Ground/mound baiting
- Trapping using either DECC staff or contract trappers

Control of wild dogs within DECC reserves will be undertaken where there is clear and adequate evidence of attacks on livestock from wild dogs from within NPWS boundaries.

Where control is required, baiting will be the preferred method of control, with preference given to the use of mound baiting stations. Aerial baiting is used over wider areas in joint programs with local RLPB's.

Dingos are considered to be part of the native flora and fauna of by NPWS, and as such the Service aims to conserve core populations of dingos within Service reserves. Campers are encouraged not to feed dingoes around campsites in reserves such as Limeburners creek NR. NPWS will monitor dingoes in these areas and if required will remove aggressive dingoes – see also 'Other Pest Related Issues'.

Priorities for control

- Wild dogs, including dingoes, have been declared as a pest animal under the Rural Lands Protection Act and they must be controlled on Crown lands. Although the dingo is unprotected under Schedule 11 of the *National Parks and Wildlife Act 1974*, it is a native animal, and there is a requirement for it to be conserved both on NPWS managed lands and within NSW generally.
- Wild dog management plans are prepared in conjunction with the local Rural Lands Protection Boards (RLPBs) and Wild Dog Control Associations (WDCA). The plans must include the dual aims of minimising livestock predation and the conservation of the dingo in the core areas of all reserves listed under Schedule 2 of the Wild Dog Pest Control Order. While the overarching management plans are developed by the RLPBs, operational plans are negotiated with individual WDCAs on an Association area basis.
- Priorities for wild dog control on reserves in Mid North Coast Region are based primarily on the level of livestock predation reported by adjoining landholders, in accord with the relevant wild dog management plans. Wild dog control measures will be focused on areas of reserves where there are current and/or historic records demonstrating significant impact on livestock from wild dogs emanating from the reserves. There will be close liaison with the local WDCA and landholders when developing control programs.
- NPWS will continue to work with RLPB to develop and review wild dog management plans. NPWS commitments in these plans include implementing cooperative 1080 baiting programs in conjunction with neighbours in problem areas. Contract wild dog trapping occurs on an annual or biannual basis to monitor effectiveness of baiting programs and in cases where reactive control wild dogs are required due to livestock and other neighbour impacts (e.g. attacks to domestic animals).

Monitoring

Liaise with neighbours and other stakeholders (RLPB's and Wild Dog Associations) about wild dog issues.

Maintain Geographic Information System (GIS) database of stock loss reports, wild dog activity and DNA analysis results. Regular review of database and generation of GIS maps to assist in annual review of NPWS Mid North Coast Region wild dog management programs

Samples of all wild dogs trapped by NPWS staff or contractors sent for DNA analysis.

Ongoing monitoring of dingoes in high visitor use areas such as Limeburners Creek NR camping grounds.

11.1.16 Feral Pig (Sus scrofa)

Distribution and abundance

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

Feral pigs occur across eastern Australia and into tropical areas of the NT. WA also has populations of feral pigs. Feral pig local distribution is limited to areas of available food, access to water and reasonably undisturbed shelter. Arid areas do not provide adequate requirements of daily water and hence is a limiting factor for feral pig distribution.

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

Within the Mid North Coast region feral pigs are known to occur within Willi Willi and Werrikimbe NP's, and an isolated sighting of a feral pig has been made within Limeburners Creek NR.

Impacts

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

Feral pigs have significant impacts on the environment, including:

- Eating or destroying native plants and animals;
- Wallowing in, fouling and disturbing soils in dams, waterholes and other moist or swampy areas.
- Creating drainage channels in swamps;
- Digging for food. This can have major impacts on vegetation and forest litter, particularly along drainage lines and around swamps and lagoons, or after rain

when the ground is softer. These actions destabilise stream banks and accelerate erosion;

- eating frogs, reptiles, birds and small mammals, and;
- spreading weeds and possibly disease.

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

Priorities for control

- Cooperative control programs with park neighbours and the RLPB will continue to be supported by NPWS. Control programs focus on trapping and baiting in areas of current activity. Traps have been built by NPWS staff and are available to assist park neighbours with control programs.
- Following the listing of "predation, habitat degradation, competition and disease transmission by feral pigs" as a Key Threatening Process in NSW, a Threat Abatement Plan will be produced that will identify high priority sites for control programs across NSW.
- Feral pig control will be undertaken within Werrikimbe and Willi Willi NP's when required to complement programs undertaken by Northern tablelands region on the western section of Werrikimbe NP and in Oxley Wild Rivers NP. Other pig control programs will be reactive in association with local Rural Lands Protection Boards.

Control

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

The maintenance of native dingo populations is likely to assist in controlling feral pigs populations in Mid North Coast Region reserves.

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

The 'Judas pig' technique has been utilised in other Regions, where their gregarious nature enables pigs fitted with radio collars to guide shooters to the location of other feral pigs. Feral pig control programs shall involve the Judas Program. Pigs are initially free-fed, then trapped in a mesh cage. One individual animal is then tagged with a radio collar and released. The "Judas" pig is followed over a period of weeks to determine where active pig sites are located. Finally, an ambush is arranged where feral pigs are either shot or trapped/shot/ or poisoned.

Monitoring

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

11.1.17 Feral Cattle (Bos taurus)

Distribution and abundance

Cattle occur across Australia, and are an important livestock animal. Feral cattle, namely Asian breeds, are found within the tropical areas of the NT where they cause environmental damage to the wetland and floodplain areas of the north.

Domesticated cattle can also lead to more site-specific problems where they are allowed to wander from private property into neighbouring vacant crown land, state forests and national parks and nature reserves.

In PMD domesticated cattle are known to occur within the boundaries of Hat Head NP, Clybucca HS and Limeburners Creek NR. They have also been removed from western sections of Werrikimbe and Willi Willi NP's.

Impacts

Domestic and wild livestock have numerous Impacts on the natural environment including:

- selective grazing pressure on native species
- soil compaction and erosion
- weed dispersal
- increased nutrient loadings
- establishment of movement trails
- potential spread of exotic diseases
- fires for "green pick"

Priorities for control

- Reserve neighbours shall be informed and required to prevent cattle from entering NPWS estate boundaries.
- In the instance of roaming stock, priorities will be determined by areas in relation to the NPWS Boundary Fencing Policy and resources available for implementation. If stock pose a public safety risk (e.g. motor vehicle collision or public nuisance), animals will be removed as a high priority. Where pest animals impact on the biodiversity conservation values of an area including threatened species and endangered ecological communities control programs will be implemented as a high priority.

Control

Neighbour database will be updated with properties with agricultural/domestic stock. Direct liaison with owners to remove stock and co-operative fencing of boundaries and construction/reconstruction of boundary fences where required in accordance with the NPWS Boundary Fencing Policy. Wild cattle will be removed from parks and reserves by mustering or shooting using authorised NPWS staff or approved contractors in accordance with an approved Shooting Operations Plan. Any livestock removed by the Region will be in accordance with the Stock Impoundment Act in association with the relevant local government, and the requirements for impoundment.

Monitoring

Reduction in cattle removed as appropriate with neighbour assistance or otherwise impounded. Monitor presence of livestock in parks and reserves in the Region. Document relevant information regarding control programs including the number of stock removed/impounded.

11.1.18 Wild Deer (Various spp.)

Distribution and abundance

Six deer species are known to have formed feral populations in Australia. These are fallow deer *(Dama dama),* red deer (*Cervus elaphus),* sambar deer *(Cervus unicolour)*, chital deer *(Axis axis)*, rusa deer *(Cervus timorensis)* and hog deer *(Axis porcinus)*.Feral deer are distributed from the highlands of NSW and Victoria into eastern SA, Tasmania, the NSW - QLD border, and the Cape York Peninsula. All deer species present in NSW have patchy distributions in forest and woodland in eastern New South Wales, with two species (Red and Fallow Deer) extending west of the Great Dividing Range (Adam 2004).

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

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

In the Mid North Coast Region deer have been reported across the landscape in the Macleay, Hastings and Manning catchments. Localised wild herds occur around the Port Macquarie area and in Lake Innes NR, Deer also been reported along the Pacific and Oxley Highways. They are potentially present in a number of escarpment reserves such as Werrikimbe NP and Mount Seaview NR.

Impacts

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

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

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

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

Feral deer on roads have caused several major car accidents in NSW in recent years. Wild deer within the Mid North Coast Region present a public safety hazard,

particularly with the small, highly mobile populations recorded in and adjacent to Lake Innes NR. Car accidents continue to cause significant damage near Port Macquarie. Given the proximity of major arterial roads in the area where feral deer have been observed to range, there is a continual risk for ongoing and potentially fatal accidents.

Control

Mid North Coast has a Regional Wild Deer Strategy (2007) and works cooperatively with other stakeholders in the region through the Mid North Coast Feral Deer Working Group since its formation in 2001.

A number of techniques are available for the control of wild deer including shooting (DECC, contract and private recreational shooters), fencing, trapping using feed based lures, oral sedation, mustering, and judas control. However, in remote areas and difficult habitat (e.g. wetlands), there are few viable cost-effective options available.

Priorities for control

- Given the current small population level of feral deer, there is a 'window of opportunity' to control the current population before it expands. However, as the population is widely dispersed, control programs will be labour intensive and require adequate resources and timeframes.
- As a range of agencies involved with the feral deer population of Thrumster - Lake Innes, including NPWS, RLPB's, Forests NSW, local government and NSW Police, joint co-operative control programs are necessary.

Monitoring

The occurrence and distribution of feral deer shall continue to be monitored within the Region as detailed in the Regional Wild Deer Pest Strategy and cooperatively with the local Working Group and stakeholders.

11.1.19 Feral Goat (Capra hirtus)

Distribution and abundance

Goats are distributed throughout the Great Dividing Range, in the semi-arid rangelands of NSW, QLD, Victoria and WA, and highlands of Tasmania. Their distribution appears to be limited by adequate water supplies, and where the dingo is absent or uncommon.

In the Mid North Coast Region limited sightings of feral goats have been made in the coastal reserves of Crowdy Bay and Hat Head NP's, Limeburners Creek and Khappinghat NR's. Feral goats are also recorded in Werrikimbe NP and in the near vicinity of Boorganna NR.

Impacts

Feral goats compete with native fauna and livestock for fodder, water and shelter, as well as cause damage to heritage sites, and are potential vectors of livestock diseases. They are potential vectors for internal parasites and diseases such as "foot and mouth", which can affect sheep and native fauna. They are known to carry foot-rot.

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

Grazing can lead to a decrease in overall cover and an increase in bare ground, which, combined with trampling and soil surface damage caused by their hooves, may result in significant increases in soil erosion. These habitat changes in turn affect native fauna, which may also be impacted by feral goats through competition for food and shelter.

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

Competition and habitat degradation by feral goats has been listed as a key threatening process under the NSW Threatened Species Conservation Act (TSC Act). Feral goats also cause damage to Aboriginal heritage sites, compete with neighbouring livestock and are potential vectors of livestock diseases. However, harvesting of feral goats has become an important income source for some landholders, and this view of goats as a potential resource needs to be taken into consideration when conducting control programs.

Priorities for control

- Feral goat numbers in the Region are to be monitored to assess the population level and any impact on Region's parks and reserves.
- Following indication of a significant population size and environmental impact, control programs will be employed.

Control

Effective control of feral goats requires an integrated approach using several complementary control techniques. The main control techniques will be aerial and ground shooting and trapping programs. In addition, if adjoining landholders adjacent to reserve boundaries have feral goats they will be encouraged to reduce feral goat numbers through mustering and trapping. The maintenance of native dingo populations is likely to assist in controlling feral goat populations in DECC reserves.

Monitoring

Sightings to be monitored and strategies implemented as appropriate. Liaison to be maintained with neighbour and RLPB's.

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

11.1.20 Feral Rabbit (Oryctolagus cuniculus)

Distribution and abundance

The rabbit has the widest distribution of any vertebrate pest species within Australia, found across the continent except for the tropical area of northern Australia. It occurs in a variety of habitats, but predominately occurs within the semi-arid rangelands and agricultural areas.

In the Mid North Coast Region rabbits are mainly confined to the hinterland agricultural areas which border Werrikimbe and Willi Willi NP or the smaller reserve such as Boorganna and Weelah NR's. Rabbits have been recorded in Goonook NR and the coastal reserves of Hat head NP and Khappinghat NR.

Impacts

Rabbits are a declared pest animal under the Rural Lands Protection Act and are listed as a Key Threatening Process under Commonwealth EPBC Act and NSW TSC Act due to competition for habitat and food resources with endangered native fauna.

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

Rabbits are associated with minimal environmental impacts in Mid North Coast Region; however populations still have the potential to compete for habitat and increase in numbers without control.

They have also impact on development sites in Satwater NP by removing ground covers which staff are trying to establish.

Priorities for control

- Current programs will continue in Saltwater NP and Khappinghat NP.
- Control programs will be implemented with stakeholders as required or where identified under a Threat Abatement Plan.

Control

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

The release of rabbit Calicivirus is considered to be a potential threat to native fauna due to likely 'prey switching' by foxes and feral cats.

Monitoring

The numbers of rabbits reported within and adjacent to Region's estate shall be monitored and a reduction in numbers following the release of rabbit Calicivirus will be the objective.

11.1.21 Cane Toad (Bufo marinus)

Distribution and abundance

Cane toads are restricted to the northern region of NSW, with well-established colonies occurring in the Tweed River Valley, Byron and Lismore areas. Their range extends along the coast as far south as Yamba, with isolated colonies around Angourie, Mororo-Ashby, Brooms Head and Port Macquarie. Established colonies of cane toads have been found up to 90km west of Ballina with the western boundary currently situated around Kyogle/Casino. Vagrants are regularly reported in Sydney, Wollongong, Coffs Harbour and the Central Coast area. Vagrant reports are typically only one animal often found near tourist parks or landscape/nursery supplies or along railway or highway corridors.

Cane Toads has been recorded around the rural/ urban area fringing Lake Innes NR from late 1995 to 2006. Individual cane toads have also been recorded at various locations within the Region (Taree and Kempsey), and are most likely associated with incidental releases through inter-state nursery transport from QLD. The population around Lake Innes NR is currently the southern most recorded breeding population, though individual cane toads are recorded further south to Canberra. No toads were detected during the 2007 NPWS and community "muster".

Impacts

The cane toad is poisonous at all stages of its life (eggs, tadpoles, toadlets and adult toads) and they impact on native fauna during all of these stages. Their ability to survive in a range of habitats and wide temperature ranges (5-40^{o}C) increases their threat to native species. Insects, smaller toads and native frogs, small snakes and the occasional small mammal are all part of the cane toads' diet. Not only do they prey on native fauna, but they also compete for food, shelter and breeding sites. Summers in Northern NSW provide ideal breeding conditions for cane toads. Females lay between 8,000-35,000 eggs at a time and may lay two clutches each year.

The invasion and establishment of cane toads has been listed as a Key Threatening Process under both NSW (TSC Act) and Australian (*Environment Protection and Biodiversity Act 1999*) threatened species legislation. Cane Toads taken as prey by native fauna an cause death to both animals.

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

Priorities for control

- Priorities for control are guided by the Northern Branch Cane Toad Management Strategy (2007) and the MNC Cane Toad pest Strategy (1999).
- In Mid North Coast Region the focus is on minimising the impact on native species by:
    1. eradicating existing isolated populations on and nearby to Lake Innes NR in the Port Macquarie area and any other area where Cane Toads are detected,
    2. Preventing the establishment of new populations, and,
    3. Maintaining and developing community interest and awareness in Cane Toad control.

Control

Cane toad management in Mid North Coast Region is largely undertaken by DECC staff (Discovery Program), contractors and volunteers (Port Macquarie Landcare) with assistance from local government. Raising public awareness and encouraging members of the public to hand in suspected live toads minimises the likelihood of native frogs being accidentally killed. Sightings and reports from the public are crucial in providing a quick response to new incursions. Following any confirmed report of toads in a new area, DECC will, where possible, undertake a mailbox-drop to surrounding residents, conduct spotlight surveys and will set traps to detect and remove any new colony that may have established.

As Cane Toads are a relatively recent introduction (approx.10 years) into the Mid North Coast region, community education has been the focus of the Cane Toad control strategy for this species. Given that initially native frogs were confused for cane toads, there is a need to stress correct identification for cane toads. The guidelines developed from the "Frog and Toad Discovery Program" for community and school education will continue to guide how the Region to address the cane toad issue.

Monitoring

A database of cane toad sightings shall be maintained by the Region and a decline in population size of toads will be the objective. A further objective will be that there will

be an increase in the ability of the community to correctly identify cane toads from local native frog species.

11.1.22 Feral Horse (Equus caballus)

Distribution and Abundance

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

Currently, feral horses have only been recorded in one reserve in Mid North Coast region, Bugan NR.

Impacts

The impact of feral horses in Bugan NR are not known at this stage. However, feral horses accelerate erosion through trampling, compaction and grazing. They also impact on native vegetation and ground-nesting birds, foul water holes and contribute to the spread of weeds. In high altitude alpine herb fields trampling and grazing of bog and fen communities creates gully lines along horse trails that drain these sensitive communities. In water catchment areas, feral horse impacts accelerate soil erosion that increases sedimentation and potential transference of dangerous pathogens into water supplies. As horse density within conservation reserves increase their impacts on the environment become more significant.

Priorities for control

- The removal of feral horse from Bugan NR to reduce damage to threatened species, endangered ecological communities and reduce risk to vehicular traffic.

Control

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

Monitoring

The effectiveness of horse removal programs will be assessed by measuring the reduction over time of the horse population in the park and preventing increases in local density and expansion of horse distribution. Monitor the number and movements of mobs in Bugan NR.

11.1.23 Koi Carp (Cyprinus carpio Koi)

Distribution and Abundance

Carp are large freshwater fish, which can be distinguished from goldfish by their pair of barbels (whiskers) at each corner of their mouth. They have small eyes, thick lips, a forked tail and a single dorsal fin with strongly serrated spines (Port Stephens Fisheries Centre 2004). If they escape into the wild however Koi Carp can grow up to 10kg have been caught in Australia, but weights around 4-5kg are more common (Port Stephens Fisheries Centre 2004).

Carp are native to central Asia. They are extensively farmed in Europe, Asia and the Middle East, and are a popular angling fish is Europe. However, in North America, Canada and Australia they are considered a significant pest (Port Stephens Fisheries Centre 2004).

Carp were introduced to Australia both deliberately, in an attempt to imitate the European environment, and accidentally, through the escape of ornamental or aquaculture fish (Port Stephens Fisheries Centre 2004).

Carp are usually found in still or slow flowing waters at low altitudes, however Carp are very versatile, and can live in a great variety of habitats including highly degraded areas. Carp are now the most abundant large freshwater fish in some areas, including most of the Murray-Darling basin, and are thought to have contributed to the degradation of our natural aquatic ecosystems (Port Stephens Fisheries Centre 2004).

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

Impacts

Carp are widely believed to have detrimental effects on native aquatic plants, animals and general river health, particularly through their destructive feeding habits (Port Stephens Fisheries Centre 2004). Some probable impacts of Carp include reducing water quality, increasing the likelihood of algal blooms, causing erosion, impacting on invertebrates and aquatic plants, potential disease outbreaks and reduction in native fish numbers (Port Stephens Fisheries Centre 2004).

Carp were recently listed as a Class 1 Noxious Species in NSW under the noxious species provisions of the *Fisheries Management Act 1994*.

Priorities for control

- Koi Carp in Macquarie NR are a pest that the community has identified as a high priority for action at the local level and has been identified in the Macquarie NR Draft Pest Strategy. Both the Port Macquarie-Hastings Council and NSW Fisheries support for a collaborative program.
- It is also a pest which threatens the conservation, cultural heritage or recreational values of an area. There existed a window of opportunity and for which continued management is necessary to maintain benefits gained from previous control programs on this species in the Port Macquarie – Wrights Creek environs.

Control

Management Strategies for Macquarie NR include:

- NSW Fisheries to be requested to use electrofishing to stun, catch and euthanase Carp in Wrights Creek. Electrofishing involves passing an electric current through water via electrodes which stuns nearby fish, leading to their disorientation and easy capture. Electrofishing can be dangerous and therefore operators require a high level of training and rigorous safety standards must be followed. NSW Fisheries have used this method in Wrights Creek in the recent past with success.
- Carp in Wrights Creek can be also be opportunistically netted and euthanased. This method has also been effective in the recent past, however is very time consuming and not as nearly as effective as electrofishing.

- Research is also being conducted on controlling carp populations using 'daughterless carp' technology. This technology involves manipulating the genes of carp to produce an inheritable 'daughterless carp' gene, which prevents fish from developing as females. It is predicted that this could greatly reduce carp numbers within 20-30 years of its release.
- Rehabilitation of Wrights Creek is important in order to change the aquatic environment to favour native fish. This will be undertaken in conjunction with bush regeneration activities (see Section 8.10).
- A National Management Strategy for Carp Control has been developed by the Carp Control Coordinating Group (CCCG). The CCCG consists of state, territory and federal representatives and coordinates nation-wide research and management responses.
- Produce GIS layer showing the distribution and abundance of Carp in the Mid North Coast Region.
- Media coverage and educational programs to be pursued in combination with NSW Fisheries to discourage the possession of carp in aquaria, garden ponds and dams. An information brochure to be produced.

Monitoring

Continue to monitor the distribution and abundance of carp in Macquarie Nature Reserve and the success of above management strategies. Monitor water quality and carp abundance every 6 months in conjunction with NSW Fisheries.

11.1.24 Black Rat (Rattus rattus)

Distribution and Abundance

The Black Rat is a cosmopolitan species endemic to Asia and Europe . It was probably introduced to Australia with the first fleet (Strahan 1995). It is now widespread around much of Australia's wet coastal fringe. They are restricted from penetrating the arid inland areas of Australia by their reliance on a ready water supply.

The Black Rat is predominantly nocturnal, sheltering in nests of shredded plant material in extensive shallow burrows, walls or roof cavities. It is omnivorous, with a diet regulated by food availability, and the age and sex of the individual. They are good climbers and swimmers and can access a wide variety of habitats.

Two rodents, Black Rat (*Rattus rattus*) and House Mouse *(Mus musculus)* have been recorded in the Trial Bay Camp Ground of the Arakoon State Conservation Area. Both are non-natives and are regarded as pest species. Most years during the Christmas and Easter Holiday periods the National Parks and Wildlife Service receives numerous complaints of rodent damage to property. A management plan has been prepared to address the problems caused by the seasonally large rodent population in the campground. A factor contributing to the large rodent population is the plentiful rodent habitat provided by over grown garden beds and copses of exotic and native vegetation.

Impacts

The Black Rat has a generalist diet, and is known to take seeds, green plant material fungi, invertebrates, small vertebrates and eggs as food. Overseas research has documented negative impacts of this rat on invertebrates, lizards and birds.

Of particular interest to this baiting program is the Brush-tailed Phascogale *(P. tapoatafa)*, because it can occupy a similar ecological niche to the Black Rat. The Brush-tailed Phascogale is a small arboreal marsupial that feeds on insects, spiders and occasionally small vertebrates. It inhabits forests with hollow trees, rotten stumps and sparse ground cover, and has a home range of 20-70 hectares for females and

twice that for males (NPWS 2000). Within the camp ground there are several areas of potential Brush-tailed Phascogale habitat, including the picnic areas, where they are regularly seen.

On Lord Howe Island, the Black Rat has been implicated in the decline and extinction of five species of birds, two species of lizards, in the extinction of two large-sized land snails that lived in the southern mountains of Lord Howe Island. The Black Rat is a known carrier of several diseases, including *leptospirosis* and *salmonellosis*, transmitted to humans through its urine and faeces. The large rodent population in the camp ground therefore constitutes a public health risk.

Priorities for control

The management plan addresses the short and long term management of the Black Rat population in the Trial Bay camp ground by concentrating on three main areas:

1. The reduction of the Black Rat population following peak visitor periods;
2. The reduction of food available to the Black Rat population in the camp ground,
3. The reduction of rodent habitat in the camp ground.

The management plan objectives are:

1. To reduce rodent damage to visitor property;
2. To limit the rodent population in the camp ground; and,
3. To limit the rodent population in the camp ground with minimum impact on local native fauna, particularly the Brush-tailed Phascogale.

An integral part of the management plan is reducing rodent habitat in the camp ground. Black Rat nests in walls/roof cavities or in sheltered areas amongst shrubs and thick groundcover. They have a home range of approximately 40-50 metres and prefer their nest to be within a reasonable distance of their food source.

Control

While the application of rodenticides has achieved results, they are only short term and do not address the underlying problem, which is the abundance of food available to the rodents caused by poor waste disposal. Currently “grey water ” and some food scraps are disposed of in situ at the camp sites. This is providing abundant food for an expanded rodent population, most particularly during peak Christmas and Easter visitation periods. This has led to an abundance of food for the exotic rodent, Black Rat. To eliminate in situ grey water disposal, a central disposal point should be constructed when funds are available.

The camp ground rules have been amended to prohibit in situ grey water disposal. Additional to these rules, an education program should be instituted to inform visitors of the repercussions from the disposal of food scraps and grey water in situ at the camp sites. The program should identify the washing up sinks in the amenity blocks as the correct venue for the safe disposal of these wastes.

The timing for the Black Rat baiting program is dependent upon the life cycle of the B-T Phascogale. Rat baiting is not advised between May and November, when the B-T Phascogale is undergoing crucial life cycle stages. Baiting should be conducted several times during the year, as rodents will migrate from surrounding land to occupy the vacant ecological niche created by the removal of the. Baiting will commence in early December, after the young Brush-tailed Phascogales have been weaned and prior to the Christmas holiday period, and will commence in March, prior to the Easter holiday period and before the Brush-tailed Phascogale mating period.

Monitoring

The rodent population in the camp ground will not remain static throughout the year, but will fluctuate as resources change. The Christmas baiting program should be

conducted each year, however, the Easter baiting program is dependant upon the size of the rat population. A small mammal survey (100 trap nights) is recommended to be conducted each year in Feb/Mar to monitor changes to the rat population and assess the affect of the rat control program. A standard data sheet should be used to record baiting results.

It will be necessary to monitor the grey water disposal on a regular basis to assess compliance with camp ground rules and to determine the best means of informing park visitors of their responsibilities in regards to grey water disposal.

11.1.25 Indian or Common Myna (Acridotheres tristis)

Distribution and abundance

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

Indian Mynas are now widely distributed throughout the Region, particularly in the coastal areas adjoining major towns and cities. Birds have been identified in numerous locations including the major towns/cities of Taree, Port Macquarie and Kempsey.

Impacts

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

Priorities for control

- The Mid North Coast Region will encourage community groups through their local Landcare groups and LGA's to undertake control programs of any know occurrences to reduce the spread of the birds in their areas.

Control

A trapping system developed by Dr Chris Tidemann at the Australian National University (ANU) is currently being trialed by a number of community groups and local councils along coastal New South Wales. Trapping has been successful in cities such as Canberra in reducing localised populations of Indian Mynas. Traps are currently held at the local NPWS Hastings depot and Port Macquarie Landcare.

A culling program is also being undertaken in the in the Region by the Game Council of NSW with the local Port Macquarie Landcare Group.

Monitoring

In the Mid North Coast Region, NPWS staffs are to actively record/maintain information on the locations of where Indian Mynas are present and enter this information onto the Wildlife Atlas database.

11.1.26 Bell Miner Associated Dieback (BMAD)

Distribution and Abundance

Bell Miner Associated Dieback (BMAD) is found in coastal forest types between Victoria and southern Queensland. Dieback has been recorded in eucalypt forest communities in a range of areas including parts of Kumbatine NP and Willi Willi NP, and the actual distribution is not known in detail. In each of these situations an abundance of bell miners (Manorina melanophrys) is considered to be associated with the dieback.

Impacts

Bell miners (bellbirds) are a natural part of eucalypt forests, however in some reserves their populations have increased in size and the birds have become more widely distributed. Changes in bell miner populations have increased the populations of sap-feeding insects called psyllids, insects strongly associated with dieback. Dieback is a condition in which trees progressively die, from the top downward.

The Impacts of BMAD range from biodiversity to economic and recreational. Forests infected with BMAD are severely degraded and in some situations are beyond recovery and the only ecological option is to “re-start the forest”.

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

Management Objectives

A BMAD Working Group has been established to investigate strategies to deal with BMAD. Strategies are being developed with current research trials to be established throughout a number of reserves in northern NSW, including plots to be established in Kumbatine NP. NPWS is implementing these research trials to reduce dieback in current locations and prevent further dieback occurring.

Control Priorities

- When methods are available undertake control of BMAD in affected areas of Mid North Coast Region.

Control Techniques

Control of BMAD is a difficult challenge and in the absence of empirical evidence to confirm the causes, operational activities to prevent spread is limited to weed control and fire management. The use of fire to manage Lantana and manipulate Bell miner habitat is the more useful tool available for mitigating BMAD Impacts at this stage.

Monitoring

Continue to work cooperatively with the BMAD Working Group. Assist with the research project as required by observing and recording changes in vegetation structure in eucalypt forest communities in Kumbatine NP. Observe and monitor Bell Miner populations and any ‘dieback’ problems in other eucalypt forests in reserves across the Region.

11.2 Mid North Coast - Other Pest Related Issues

11.2.1 Dingo Risk Management (Canis lupus dingo)

Distribution and Abundance

Dingo issues associated with visitor areas occur in Limeburners Creek NR, Crowdy Bay NP and Hat Head NP. Pure dingoes and their hybrids occur within these parks and reserve. The majority of dingo human interactions occur in the Point Plomer camping area and to a lesser extent at Diamond head in Crowdy Bay NP and Smoky

Rest Area in hat head NP. Limeburners Creek NR is listed as a Dingo Management Area on Schedule 2 of the Pest Control Order No.2 for wild dogs under the Rural Lands Protection Act 1998.

Impacts

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

Management Objectives

Management of dingoes in visitor areas promotes visitor safety and the conservation of dingoes. Dingo management has adopted a risk management approach, whereby the likelihood and consequence of dingo-human interactions are evaluated. Control strategies to lessen the risk are then implemented. It is acknowledged that not all dingo-human risks can be controlled and visitors must be informed of the risks. A Risk Treatment Plan is being developed for Limeburners Creek NR detailing risk assessments and control strategies.

Monitoring

Monitoring involves three levels - preventative, reactive and research.

Preventative monitoring consists of:

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

Reactive monitoring includes:

- Evaluating individual dingo risk and
- Hazing.

Research includes:

- Home range and movement patterns,
- Social relationships within the pack, and
- DNA collection and analysis.

12 Appendices

12.1 Appendix 1 Pest Control Priorities

Summary to be completed in final Strategy

WEED PROGRAMS	Critical				High		Medium				Low			Control Strategy Summary	Key Performance Indicators
	1. Threatened species/communities	2. Human Health	3.Impacts on agriculture	4.New Incursions	5.World Heritage	6.Cultural Heritage	7.Wilderness/Wild Rivers	8.Recreation/Aesthetic	9.Community Co-operative program	10.Regional Plan	11.Ciommunityprograms/local impacts	12.Existing programs	Window of opportunity		
Bitou Bush													●		
Lantana													●		
Mysore Thorn													●		
Groundsel Bush													●		
Salvinia													●		
Cabomba													●		
Glory Lily													●		
Bushland Weeds													●		
Rainforest Weeds													●		
Exotic Pine													●		
Exotic Grasses													●		
Exotic Vines													●		

PRELIMINARY DRAFT

PEST ANIMAL PROGRAMS	Critical				High		Medium				Low			Control Strategy Summary	Key Performance Indicators
	1. Threatened species/communities	2. Human Health	3.Impacts on agriculture	4.New Incursions	5.World Heritage	6.Cultural Heritage	7.Wilderness/Wild Rivers	8.Recreation/Aesthetic	9.Community Co-operative program	10.Regional Plan	11.Ciommunityprograms/local impacts	12.Existing programs	Window of opportunity		
Fox													●		
Feral Cat													●		
Wild Dog													●		
Feral Pig													●		
Feral Cattle													●		
Wild Deer													●		
Feral Goat													●		
Feral Rabbit													●		
Cane Toad													●		
Feral Horses													●		
Koi Carp													●		
Black Rat													●		
Indian Myna													●		
BMAD													●		

12.2 Appendix 2 Timing of Chemical Control Programs

It is essential for effective chemical control to treat weeds at the correct time of year. The optimal time for chemical application is dependant on the chemical used, the chemicals mode of action and the growth stage of the plant. Table 1 outlines the best time for chemical application. The table can be used as a guide when planning annual chemical control works programs.

Table 1: Key Weed Species of M N C Region and Appropriate Months for Chemical Control

Species	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Bitou Bush												
Lantana												
Giant P.G.												
Mysore								?	?			
Crofton weed												
Groundsel												
Pampas												
Whiskey												
Exotic Pine												
Bushland weeds												
Rainforest weeds												
Salvinia						?	?	?				
Cabomba			?	?	?							

Legend	
Best time to spray	
Apparent best time to spray (from references)	?
Spray if conditions suitable	
Dependent on species treated	

12.3 Appendix 3 Noxious Weeds

PLANTS DECLARED NOXIOUS

Noxious weeds are those plants declared by order of the Minister for Primary Industries under the Noxious Weeds Act (1993). For a native plant to be declared noxious the additional consent of the Minister administering the National Parks and Wildlife Act (1974) is also required.

1. The Minister may, by order published in the Gazette, make a weed control order for a specified plant.
2. A weed control order is to do the following:

a) declare that the plant is a noxious weed

b) apply a weed control class or classes to the plant

c) specify the land (being part of the whole of the State) to which the order applies

d) specify the control measures that are to be, or may be, used to control the plant in general or particular circumstances

e) specify the control objectives for the plant

f) specify the term of the order (being a period not exceeding 5 years).

3. A plant that is the subject of a weed control order is a **noxious weed** for the purposes of this Act.
4. An order takes effect from the date of its publication in the Gazette or on a later date specified in the order.
5. The Minister may not make an order declaring any plant that is native to the State to be a noxious weed, except with the consent of the Minister administering the *National Parks and Wildlife Act 1974.* [(From Noxious Weeds Act (1993)].

NSW Department of Primary Industries administers the Noxious Weeds Act (1993), together with other legislation related to weed management. It also plays a major role in biological control programs and their monitoring and in various research programs on weed control and provision of technical advice.

The Objectives of the Noxious Weed Act (1993) are:

"(a) to reduce the negative impact of weeds on the economy, community and environment of this State by establishing control mechanisms to:

(i) prevent the establishment in this State of significant new weeds and

(ii) restrict the spread in this State of existing significant weeds, and

(iii) reduce the area in this State of existing significant weeds,

(b to provide the monitoring of and reporting on the effectiveness of the management of weeds in this State." [From Noxious Weeds Act (1993)].

The Noxious Weeds Act (1993) classifies declared weeds into five (5) main classes, each requiring different control measures:

"(1) The following weed control classes may be applied to a plant by a weed control order:

(a) Class 1, State Prohibited Weeds,

(b) Class 2, Regionally Prohibited Weeds,

(c) Class 3, Regionally Controlled Weeds

(d) Class 4, Locally Controlled Weeds

(e) Class 5, Restricted Plants.

(2) The characteristics of each class are as follows:

(a) **Class 1** noxious weeds are plants that pose a potentially serious threat to primary production or the environment and are not present in the State or are present only to a limited extent.

(b) **Class 2** noxious weeds are plants that pose a potentially serious threat to primary production or the environment of a region to which the order applies and are not present in the region or are present only to a limited extent.

(c) **Class 3** noxious weeds are plants that pose a serious threat to primary production or the environment of an area to which the order applies, are not widely distributed in the area and are likely to spread in the area or to another area.

(d) **Class 4** noxious weeds are plants that pose a threat to primary production, the environment or human health, are widely distributed in an area to which the order applies and are likely to spread in the area or to another area.

(e) **Class 5** noxious weeds are plants that are likely, by their sale of their seeds or movement within the State to an area of the State, to spread in the State or outside the State.

(3) A noxious weed that is classified as a Class 1, 2 or 5 noxious weed is referred to in this Act as a ***notifiable weed.***

(1) Before making a weed control order, the Minister is to cause the proposed order to be subject to public consultation.

(2) The public consultation procedure is as follows:

(a) notice of the intention to make the order is to be published in a newspaper circulating generally in the area in which the land subject to the proposed order is located, or, if appropriate, in a newspaper circulating throughout the whole State.

(b) the notice is to indicate when and where a copy of the proposed order is to be placed on public exhibition and that submissions may be made about it.

(c) the proposed order (and any other information the Minister considers appropriate) is to be publicly exhibited for a period of at least 21 days after the notice is given

(d) the Minister is to consider any public submission on the proposed order.

(3) The regulations may make provision for or with respect to the notification and exhibition or proposed weed control orders.

(4) Nothing in this section required the Minister to undertake any further public consultation if a proposed order is changed as a result of the public consultation procedure."

[From the Noxious Weeds Act (1993)]

PRELIMINARY DRAFT

MID NORTH COAST REGION DECLARED NOXIOUS WEEDS

The following table details the noxious weeds declared within the Mid North Coast Weeds Advisory Committee area.

Plants Declared Noxious (per *Noxious Weeds Act 1993* as Gazetted) **Class 1** - The plant must be eradicated from the land and the land must be kept free of the plant (Notifiable – State prohibited) **Class 2** - The plant must be eradicated from the land and the land must be kept free of the plant (Notifiable – Regionally prohibited) **Class 3** - The plant must be fully and continuously suppressed and destroyed (Regionally controlled) **Class 4** - The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority (Locally controlled) **Class 5** - Requirements in the *Noxious Weeds Act 1993* for a notifiable weed must be complied with (Notifiable – Sale restricted) *(WoNS)* = Weed of National Significance - Denotes no Declaration * Denotes sale restricted Correct as at 06/10/2006		**Local weed control authorities** **Great Lakes**	**Gloucester**	**Greater Taree**	**Port Macquarie - Hastings**	**Kempsey**
Common Name	**Botanical Name**	**Class of weed**				
African Boxthorn	*Lycium ferocissimum*	4	4	-	-	-
African Feather Grass *	*Pennisetum macrourum*	5	5	5	5	5
African Turnip Weed *	*Sisymbrium runcinatum*	5	5	5	5	5
African Turnip Weed *	*Sisymbrium thellungii*	5	5	5	5	5
Alligator Weed *(WoNS)* *	*Alternanthera philoxeroides*	2	2	2	2	2
Anchored Water Hyacinth *	*Eichhornia azurea*	1	1	1	1	1
Annual Ragweed *	*Ambrosia artemisiifolia*	5	5	5	5	5
Arrowhead *	*Sagittaria montevidensis*	5	5	5	5	5
Artichoke Thistle *	*Cynara cardunculus*	5	5	5	5	5
Athel Tree/Athel Pine *(WoNS)* *	*Tamarix aphylla*	5	5	5	5	5
Bathurst/Noogoora/Californian/ Cockle Burrs	*Xanthium spp*	4	4	4	4	4
Bear-skin Fescue	*Festuca gautieri*	5	5	5	5	5
Bitou Bush *(WoNS)* *	*Chrysanthemoides monilifera ssp rotundata*	4	-	4	4	4
Black Knapweed *	*Centaurea nigra*	1	1	1	1	1
Blackberry *(WoNS)* *	*Rubus fruticosus agg spp*	4	4	4	4	4
Boneseed *	*Chrysanthemoides monilifera ssp monilifera*	4	-	4	4	4
Bridal Creeper *(WoNS)* *	*Myrsiphyllum asparagoides*	5	5	5	5	5
Broadleaf Pepper Tree *	*Schinus terebinthifolius*	3	3	3	3	3
Broomrapes *	*Orobanche spp* except the native spp *O. cernua* var *australiana* and *O. minor*	1	1	1	1	1
Burr Ragweed *	*Ambrosia confertiflora*	5	5	5	5	5
Cabomba *(WoNS)* *	*Cabomba caroliniana*	5	5	5	5	5
Cayenne Snakeweed *	*Stachytarpheta cayennensis* *Stachytarpheta urticifolia*	5	5	5	5	5
Chilean Needle Grass *(WoNS)* *	*Nassella neesiana*	4	4	4	4	4
Chinese Celtis *	*Celtis sinensis*	3	3	3	3	3
Chinese Violet *	*Asystasia gangetica ssp micrantha*	1	1	1	1	1
Clockweed *	*Gaura lindheimeri*	5	5	5	5	5
Clockweed *	*Gaura parviflora*	5	5	5	5	5
Columbus Grass	*Sorghum x almum*	4	4	4	4	4
Corn Sowthistle *	*Sonchus arvensis*	5	5	5	5	5
Crofton Weed	*Ageratina adenophora*	4	4	4	4	4
Dodder *	*Cuscuta spp* except the native spp *C.australis*, *C. Tasmania* and *C. victoriana*	5	5	5	5	5
East Indian Hygrophila *	*Hygrophila polysperma*	1	1	1	1	1
Egeria	*Egeria densa*	5	5	5	5	5
Espartillo *	*Achnatherum brachychaetum*	5	5	5	5	5
Eurasian Water Milfoil *	*Myriophyllum spicatum*	1	1	1	1	1
Fine-Bristled Burr Grass *	*Cenchrus brownii*	5	5	5	5	5

PRELIMINARY DRAFT

Plants Declared Noxious (per *Noxious Weeds Act 1993* as Gazetted)		**Local weed control authorities**				
Class 1 - The plant must be eradicated from the land and the land must be kept free of the plant (Notifiable – State prohibited) **Class 2** - The plant must be eradicated from the land and the land must be kept free of the plant (Notifiable – Regionally prohibited) **Class 3** - The plant must be fully and continuously suppressed and destroyed (Regionally controlled) **Class 4** - The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority (Locally controlled) **Class 5** - Requirements in the *Noxious Weeds Act 1993* for a notifiable weed must be complied with (Notifiable – Sale restricted) *(WoNS)* = Weed of National Significance - Denotes no Declaration * Denotes sale restricted Correct as at 06/10/2006		**Great Lakes**	**Gloucester**	**Greater Taree**	**Port Macquarie - Hastings**	**Kempsey**
Common Name	**Botanical Name**	**Class of weed**				
Fountain Grass *	*Pennisetum setaceum*	5	5	5	5	5
Gallon's Curse *	*Cenchrus biflorus*	5	5	5	5	5
Giant Parramatta Grass	*Sporobolus fertilis*	4	3	4	4	4
Giant Rats Tail Grass	*Sporobolus pyramidalis*	3	3	3	3	3
Glaucous Starthistle *	*Carthamus glaucus*	5	5	5	5	5
Golden Dodder	*Cuscuta campestris*	4	4	4	4	-
Golden Thistle *	*Scolymus hispanicus*	5	5	5	5	5
Green Cestrum *	*Cestrum parqui*	3	3	3	3	3
Groundsel Bush *	*Baccharis halimifolia*	3	3	3	3	3
Harrisia Cactus *	*Eriocereus spp*	4	4	4	4	4
Hawkweed *	*Hieracium spp*	1	1	1	1	1
Horsetail *	*Equisetum* species	1	1	1	1	1
Hygrophila *	*Hygrophila costata*	2	-	2	2	2
Hymenachne *(WoNS)* *	*Hymenachne amplexicaulis*	1	1	1	1	1
Johnson Grass	*Sorghum halepense*	4	4	4	4	4
Karoo Thorn *	*Acacia karroo*	1	1	1	1	1
Kochia *	*Bassia scoparia / Kochia scoparia*	1	1	1	1	1
Lagarosiphon *	*Lagarosiphon major*	1	1	1	1	1
Lantana (All) *(WoNS)* *	*Lantana spp*	5	5	5	5	5
Lantana (Red Flowering) *(WoNS)* *	*Lantana camara*	4	4	4	4	4
Long-Leaf Willow Primrose *	*Ludwigia longifolia*	4	4	4	4	4
Mexican Feather Grass *	*Nassella tenuissima*	1	1	1	1	1
Mexican Poppy *	*Argemone mexicana*	5	5	5	5	5
Miconia *	*Miconia spp*	1	1	1	1	1
Mimosa *(WoNS)* *	*Mimosa pigra*	1	1	1	1	1
Mintweed	*Salvia reflexa*	4	-	-	-	-
Mossman River Grass *	*Cenchrus echinatus*	5	5	5	5	5
Mother Of Millions *	*Bryophyllum spp*	3	3	3	3	3
Nodding Thistle	*Carduus nutans*	-	4	4	4	-
Onion Grass *	*Romulea spp and vars* except *R. rosea* var. *australis*	5	5	5	5	5
Oxalis *	All *Oxalis* spp and vars except the natives *O. chnoodes*, *O. exilis*, *O. perennans*, *O. radicosa*, *O. rubens*, and *O. thompsoniae*	5	5	5	5	5
Pampas Grass *	*Cortaderia spp*	4	4	4	4	4
Parthenium Weed *(WoNS)* *	*Parthenium hysterophorus*	1	1	1	1	1
Paterson's Curse, Vipers Bugloss, Italian Bugloss	*Echium spp*	4	4	4	4	4
Pond Apple *(WoNS)* *	*Annona glabra*	1	1	1	1	1
Prickly Acacia *(WoNS)* *	*Acacia nilotica*	1	1	1	1	1
Prickly Pear *	*Cylindropuntia* species	4	4	4	4	4
Prickly Pear *	*Opuntia* spp except *O. ficus-indica*	4	4	4	4	4
Red Rice *	*Oryza rufipogon*	5	5	5	5	5

PRELIMINARY DRAFT

Plants Declared Noxious (per *Noxious Weeds Act 1993* as Gazetted)		**Local weed control authorities**				
Class 1 - The plant must be eradicated from the land and the land must be kept free of the plant (Notifiable – State prohibited) **Class 2** - The plant must be eradicated from the land and the land must be kept free of the plant (Notifiable – Regionally prohibited) **Class 3** - The plant must be fully and continuously suppressed and destroyed (Regionally controlled) **Class 4** - The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority (Locally controlled) **Class 5** - Requirements in the *Noxious Weeds Act 1993* for a notifiable weed must be complied with (Notifiable – Sale restricted) *(WoNS)* = Weed of National Significance - Denotes no Declaration * Denotes sale restricted Correct as at 06/10/2006		**Great Lakes**	**Gloucester**	**Greater Taree**	**Port Macquarie - Hastings**	**Kempsey**
Common Name	**Botanical Name**	**Class of weed**				
Rhus Tree *	*Toxicodendron succedanea*	4	4	4	4	4
Rubbervine *(WoNS)* *	*Cryptostegia grandiflora*	1	1	1	1	1
Sagittaria *	*Sagittaria platyphylla* *Sagittaria graminea*	5	5	5	5	5
Salvinia *(WoNS)* *	*Salvinia molesta*	3	3	3	3	3
Sand Oat *	*Avena strigosa*	5	5	5	5	5
Scotch Broom	*Cytisus scoparius*	-	4	-	-	-
Senegal Tea Plant *	*Gymnocoronis spilanthoides*	1	1	1	1	1
Serrated Tussock *(WoNS)* *	*Nassella trichotoma*	4	4	4	4	4
Siam Weed *	*Chromolaena odorata*	1	1	1	1	1
Smooth-Stemmed Turnip *	*Brassica barrelieri ssp oxyrrhina* *Brassica oxyrrhina*	5	5	5	5	5
Soldier Thistle *	*Picnomon acarna*	5	5	5	5	5
Spiny Burrgrass *	*Cenchrus incertus*	4	4	4	4	4
Spiny Burrgrass *	*Cenchrus longispinus*	4	4	4	4	4
Spotted Knapweed *	*Centaurea maculosa*	1	1	1	1	1
St. John's Wort	*Hypericum perforatum*	3	3	3	3	-
Texas Blueweed *	*Helianthus ciliaris*	5	5	5	5	5
Water Caltrop *	*Trapa Spp*	1	1	1	1	1
Water Hyacinth *	*Eichhornia crassipes*	3	3	3	3	3
Water Lettuce *	*Pistia stratiotes*	1	1	1	1	1
Water Soldier *	*Stratiotes aloides*	1	1	1	1	1
Willows *(WoNS)* *	*Salix spp* except *S. babylonica, S.* x *reichardtii, S.* x *calodendron*	5	5	5	5	5
Witchweed *	*Striga species*	1	1	1	1	1
Yellow Burrhead *	*Limnocharis flava*	1	1	1	1	1
Yellow Nutgrass *	*Cyperus esculentus*	5	5	5	5	5

12.4 Appendix 4 Declared Noxious Animals

Name of Feral Animal	Scientific Name	Gloucester RLPB	Kempsey RLPB	Armidale RLPB
Declared noxious animals				
Wild Dog	*Canis familiaris*	nox	nox	nox
Pig	*Sus scrofa*	nox	nox	nox
Rabbit	*Oryctolagus cuniculus*	nox	nox	nox
Declared pest animal				
Fox	*Vulpes vulpes*	pest	pest	pest
Feral animal considered to be an environmental threat by NPWS				
Cat	*Felis catus*	env		
Cattle	*Bos spp*	env		
Deer - chital	*Axis axis*	env		
Deer - hog	*Axis porcinus*	env		
Deer - red	*Cervus elaphus*	env		
Deer - rusa	*Cervus timorensis*	env		
Deer - sambar	*Cervus unicolour*	env		
Deer - fallow	*Damas damas*	env		
Goat	*Capra hircus*	env		
Cane Toad	*Bufo marinus*	env		
Other; eg Sparrow,	*various*	env		
Indian Myna, Starling etc,				

nox = declared noxious animal under the RLP Act
pest = declared pest animal under the RLP Act
env = other feral animals considered an environmental threat

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