NSW **National Parks and Wildlife Service**

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Central Coast Hunter Range Region

Pest Management Strategy

2008 - 2011

Department of **Environment & Climate Change** NSW

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The New South Wales National Parks and Wildlife Service (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 NPWS carrying out functions on behalf of the Director General and the Minister of DECC.

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Glossary of terms

CCHRR	Central Coast Hunter Range Region, NSW National Parks and Wildlife Service. A part of the NSW Department of Environment and Climate Change.
Declared Pest Animals	Any animal defined in the Rural Lands Protection Act that has had a pest control order issued
KTP	Key Threatening Process as defined in the Threatened Species Conservation Act 1995.
NP	A National Park declared under the National Parks and Wildlife Act 1974
NR	A Nature Reserve declared under the National Parks and Wildlife Act 1974
PAS	Threatened Species Priority Action Statement
Pest Animal	Any animal that is out of place
RLPB	Rural Lands Protection Board. A Statutory Authority established to administer the Rural Lands Protection Act 1998
RPMS	Regional Pest Management Strategy
SCA	A State Conservation Area declared under the National Parks and Wildlife Act 1974
SRA	A State Recreation Area declared under the National Parks and Wildlife Act 1974
TAPS	Threat Abatement Plans
Weed	A plant out of place

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, foxes, wild pigs and many weed species.

The control of pests outside of parks is the responsibility of private landholders and other agencies such as Rural Lands Protection Boards (RLPB's), local councils, various weed control County 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 impacts 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 owners and 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 as well as other actions such as wild dog and feral pig control to protect neighbouring properties 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 Reserve Pest Management Strategies, 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 parks amongst others. This strategy has a three 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 October 2007, 31 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 also has provision for the Minister of Primary Industries to declare other pests if that declaration is considered necessary.

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. The Crown is bound by this Act

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 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 dingos (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 euthanizing native animals, and
- Firearms training.

A state-wide 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. Within CCHR Area Managers are developing Reserve Pest Management Strategies or pest strategies for individual species within particular reserves.

4 Central Coast Hunter Range Regional overview

The Central Coast Hunter Range Region covers an area of approximately 12,627 square kilometres, and currently manages thirty nine reserves totalling 435,677 hectares. It is anticipated that there will be additional lands added to this total during the life of this plan.

The Region incorporates the catchments of Wyong, Hawkesbury, Colo, Lake Macquarie and the Hunter, seven Local Government Areas including Gosford, Wyong, Cessnock, Singleton, Hawkesbury, Lake Macquarie and Muswellbrook. The Region also covers three Rural Lands Protection Boards (RLPB's) namely, Hunter, Maitland and Moss Vale.

Central Coast Hunter Range Region has four area management units: Gosford, Lakes, Yango and Hunter Range. Management of these areas is through an Area Manager, several Rangers

and a team of field staff who undertake the planning and operational management of the lands under their respective control.

The Regional Manager and specialist staff including the Operations Coordinator, fire, pest, biodiversity and asset management, administration and neighbour relations are based at the Regional office. These specialist staff provide support and guidance to the Areas in the various aspects of land management specific to their fields.

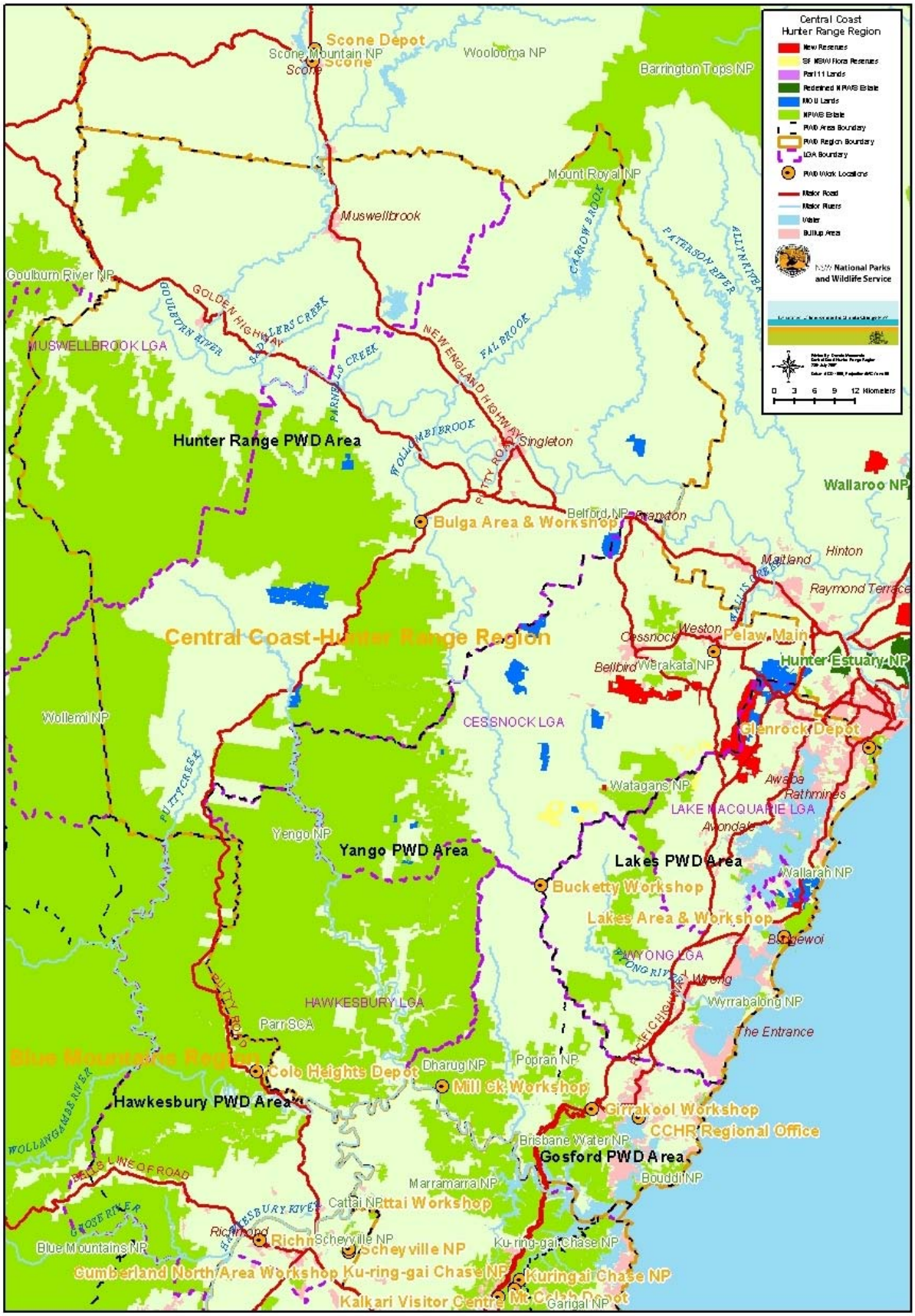
CCHR reserves have a large number of pest species due to the range of environments within the region. Although agricultural pests were recognised as such from the early days, it took more than 160 years for society to develop widespread recognition of the impact of pest plants and animals on the environment, and to conclude the impact was problematic. In the meantime introduced animals and weeds took hold.

Today the impact of pest species continues because of neighbouring land uses in rural and urban areas. Actions by individuals such as arson and release of animals for hunting, as well as larger scale processes including removal of native vegetation for development, habitat fragmentation, erosion, global warming, reduced rainfall, increased intensity and frequency of fires, all contribute to a wide variety of pest management issues on reserves.

The number of regionally initiated pest control programs has increased steadily over the past five years to total 1,342 weed and 330 vertebrate pest programs. The region has implemented a number of control programs that protect threatened species, increased the involvement of community bush regeneration groups in coastal reserves, and worked cooperatively with neighbours on a number of collaborative programs. A number of research programs are also being undertaken in cooperation with various universities and the Weeds and Invasive Animals Cooperative Research Centres.

The primary intent of this plan is to focus on the effect that pests have on threatened species. At the same time the Region intends to fully comply with the various statutory obligations to control various pest species. Examples of this commitment are the implementation of the Fox TAP programs and the current wild dog control programs.

4.1 Regional Map



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5 Pest Distribution Tables

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

5.1 Pest Animals

● 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

	Wild Dog	Fox	Feral Pig	Rabbit	Horse Cattle	Goat	Deer	Cat
LAKES AREA								
Munmorah SCA		●		⦿				○
Bird Island NR								
Colongra Swamp NR		●						○
Lake Macquarie SCA		●		⦿				○
Moon Island NR								
Pulbah Island NR		○						
Tingara Heights NR		●						○
Tuggerah NR and SCA		●	○	⦿		⦿		○
Watagans NP	●	○				⦿		○
Wallarah NP		●		⦿				○
Wyrrabalong NP		●		⦿				○
Jilliby SCA	○	○					⦿	○
Sugarloaf SCA (Gazetted 1.7.07)	●	○						○
YANGO AREA								
Dharug NP	○	●						○
Finchley AA	●	●						
Parr SCA	○	●			⦿		⦿	○
Popran NP	○	○					⦿	○
Yengo NP	●	●	⦿	⦿	⦿	⦿	⦿	⦿
GOSFORD AREA								
Bouddi NP	○	●					⦿	○
Brisbane Water NP	●	●		⦿		⦿	⦿	⦿
Cockle Bay NR		⦿						○
Howe AA							⦿	○
Mooney Mooney AA								○
Pelican Island NR		⦿						○
Riley's Island NR		⦿						○
Wamberal Lagoon NR		○						⦿
Wambina NR	○	⦿		○				○
Saratoga Island NR		○						○
Palm Grove NR	○	○						○
HUNTER RANGE AREA								
Wollemi NP	●	○	⦿	⦿	⦿		⦿	⦿
Yengo NP	●	○	⦿	⦿				⦿
Mt Royal NP	●	⦿						○
Werekata NP and SCA	●	●	⦿	⦿			○	○
Manobalai NR	●	●		⦿				○
Belford NR		●		⦿				○
Appletree AA	●	○		⦿	⦿			

5.2 Weeds

● 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)

	Bitou Bush	Lantana	Blackberry	Asparagus species	Bridal Creeper	Trees, privet Fruit, coral	Cape Ivy	Crofton Weed	Willow	Xanthium species	Exotic vines	False Acacia Robinia	Opuntia species	Tree of Heaven	LS Feather Grass, pampas grass	Aquatic weeds	St Johns Wort	Mother of Millions	Wild Tobacco Green Cestrum	African olive	Whiskey Grass Coolatai grass	Garden bulbs Watsonia Lily
LAKES AREA																						
Munmorah SCA	●	●	⦿					⦿	⦿		●	⦿	⦿		●						●	⦿
Bird Island NR		○																				
Colongra Swamp NR		●	○					⦿	⦿							⦿						
Lake Macquarie SCA	●	●	⦿	⦿		⦿		⦿			⦿		⦿			⦿		⦿			●	
Moon Island NR	●	●	○					○			○											
Pulbah Island NR	●	●		⦿									⦿									
Tingara Heights NR		⦿	○		⦿	⦿		⦿	⦿		⦿	○						○				
Tuggerah NR and SCA		○	○	⦿		○		⦿	⦿	○	⦿		○	○	○	●	⦿	○	○			○
Watagans NP		●	○			⦿		⦿		○			○							●		
Wyrrabalong NP	●	○	○	●	⦿	⦿		⦿			●				○	⦿						
Jilliby SCA		⦿	⦿					●					⦿								⦿	⦿
Wallarah NP	○	⦿																				
Sugarloaf SCA (Gazetted 1.7.07)		○	⦿										⦿									
YANGO AREA																						
Dharug NP		⦿	○	⦿	⦿			⦿			⦿			⦿	⦿			⦿	⦿		⦿	
Finchley AA																						
Parr SCA		⦿	⦿	⦿											⦿							
Popran NP		⦿	○			⦿		●			○										⦿	
Yengo NP		⦿	○						⦿	○	⦿	⦿	⦿	○	⦿	⦿	⦿	⦿	○			

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● Denotes established widespread infestation throughout a reserve
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⦿ Denotes isolated infestation restricted to a small geographic area of a reserve (encompassing new weed incursions)

	Bitou Bush	Lantana	Blackberry	Asparagus species	Bridal Creeper	Trees, privet Fruit, coral	Cape Ivy	Crofton Weed	Willow	Xanthium species	Exotic vines	False Acacia Robinia	Opuntia species	Tree of Heaven	LS Feather Grass, pampas grass	Aquatic weeds	St Johns Wort	Mother of Millions	Wild Tobacco Green Cestrum	African olive	Whiskey Grass Coolatai grass	Garden bulbs Watsonia Lily
GOSFORD AREA																						
Bouddi NP	●	●	⦿	●	⦿	⦿	⦿	⦿			⦿	⦿	⦿		⦿			⦿	⦿	⦿	⦿	⦿
Brisbane Water NP	⦿	○	⦿			⦿		●				⦿						⦿	⦿		⦿	
Cockle Bay NR		●	○	●	⦿			⦿	⦿									⦿	⦿			⦿
Howe AA																						
Mooney Mooney AA																						
Pelican Isalnd NR	⦿	⦿		○	○													⦿	⦿		⦿	⦿
Riley's Island NR	○	○	○	○	⦿	⦿													⦿		⦿	⦿
Wamberal Lagoon NR	●	●	⦿	○				⦿		○								⦿	⦿			⦿
Wambina NR	⦿	●	⦿	⦿		○		⦿		⦿	⦿								⦿			
Saratoga Island NR	⦿																					
Palm Grove NR		○	⦿			○		⦿			⦿								⦿			
HUNTER RANGE AREA																						
Wollemi NP		⦿	○	⦿	⦿	⦿	⦿		⦿	⦿	⦿	⦿	○	⦿			⦿	⦿	⦿			
Yengo NP		⦿	○		⦿	⦿						⦿	○			⦿						
Mt Royal NP								○														
Werekata NP and SCA		⦿	⦿		⦿	⦿		⦿		⦿				⦿	⦿			⦿	⦿			
Manobalai NR													⦿									
Belford NR		⦿											⦿					○		○		
Appletree AA													⦿									

6 Pest Management Objectives

The primary 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.

The NPWS program strategy is 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,
- support cooperative approaches and participation in pest management programs with the community and other agencies, and
- support off park pest management by the general community

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-shy animals and makes better uses of the resources available at the time. 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. Fox control in winter is more effective long term as females are pregnant and other food sources are generally scarcer).

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 both in terms of effect and money spent.
- Development of control priorities are set by clearly defining the problem to be addressed ie. 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 <u>minimise</u> the adverse impacts of pests, as many exotic pests are already widespread (e.g. foxes, blackberries) and for these species eradication is not possible, except in local and/or isolated areas
- 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 to strike 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 take a holistic approach, given that the control of one pest may benefit other pests, in that they attempt to control all significant pest threats at a site.

- 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 management and recreation management.
- Monitoring is being implemented, at varying levels, to demonstrate and improve the ongoing effectiveness of control programs.
- New methods, tools and strategies of pest control are always being investigated in the hope that a better end result might be achieved.

8 Pest Program Priorities

NPWS prioritises its pest control programs to focus on those areas where the impacts of pests are likely to be greatest. In determining a program the following issues need to be considered: the availability of suitable control techniques practicality and cost effectiveness of control. Resources can then be directed to ensure that the resultant control programs are effective in reducing these impacts.

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, are identified in the NSW Threatened Species Priorities Action Statement. The Fox Abatement Plan identifies fox control in Yengo, Watagans, Wollemi and Dharug NP's, which are priority sites for Brush-tailed rock-wallaby. And Mt Royal NP for Rufous Bettong
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; feral pigs in urban areas that pose a bio-security risk.
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 e.g. dog baiting in Manobalai NR and Watagans and Yengo NP's.
4. Programs to control State Prohibited or Regionally Prohibited Noxious Weeds (Control Class 1 and 2 weeds), e.g. Water hyacinth Lakes Area, Bitou bush Gosford and Lakes Areas.
5. Programs addressing new occurrences of highly invasive pest species with potential for significant impacts on park values (subject to risk/feasibility assessment) e.g. control of Mother of Millions in an area previously free of the weed, Hunter Range Area.

High Priority

1. 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 feral cattle impacting on World Heritage values of Wollemi and Yengo NP's; pest control in RAMSAR wetlands.

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

3. Programs that target pests that have been controlled in previous years and the population has been controlled to “maintenance level”, where non treatment may lead to reinvasion/regrowth back to previous levels.

Medium Priority

1. 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 willows along a declared Wild River or within a Wilderness area, or World Heritage Area.

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

3. 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 willows with the assistance of an established community group; control of Regionally Controlled Noxious Weeds (Control Class 3 weeds).

4. 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.

Low Priority

1. 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 (e.g. Dunecare group) for control of Locally Controlled and Restricted Noxious Weeds (Control Class 4 and 5 weeds).

2. 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 lantana to continue keeping them weed free.

In some circumstances, new programs may be introduced, or priority programs extended to target pests where a control “window of opportunity” is identified 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 bio-control agent becomes available.

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

8.1 Regional Vertebrate Pest Program Priorities

	Critical					High			Medium				Low	
VERTEBRATE PEST PROGRAMS	1.Threatened species/ communities	2.Human Health	3.Impacts on agriculture	4.State prohibited species	5. New occurrence -highly invasive.	1.Impact on World Heritage values	2.Impact important cultural heritage values	3.Control to 'maintenance level'	1. Impact on Wilderness, national heritage values	2. Impact on recreation, landscape values	3. Community/cooperative programs- ongoing	4. Community/cooperative programs - State/regional plan	1. Community program - local impact	2. Previous program-maintain local benefit
Wild Dog	✓		✓			✓	✓	✓		✓				✓
Fox	✓		✓				✓	✓		✓	✓	✓	✓	✓
Feral Pig		✓	✓											
Rabbit				✓			✓	✓						✓
Horse / Cattle						✓	✓	✓	✓					✓
Goat							✓	✓						
Deer			✓		✓		✓	✓						
Cat	✓						✓	✓						

8.2 Regional Weed Program Priorities

	Critical					High			Medium				Low	
WEED PROGRAMS	1.Threatened species/ communities	2.Human Health	3.Impacts on agriculture	4.Prohibited Noxious Weed	5. New occurrence -highly invasive.	1.Impact on World Heritage values	2.Impact important cultural heritage values	3.Control to 'maintenance level'	1. Impact on Wilderness, national heritage values	2. Impact on recreation, landscape values	3. Community/cooperative programs- ongoing	4. Community/cooperative programs - State/regional plan	1. Community program - local impact	2. Previous program-maintain local benefit
Bitou Bush	✓			✓			✓			✓	✓	✓		
Lantana	✓			✓		✓		✓		✓	✓		✓	✓
Blackberry	✓			✓		✓	✓	✓	✓	✓				✓
Asparagus species	✓						✓	✓		✓	✓		✓	✓
Bridal Creeper	✓						✓	✓			✓		✓	✓
Privet trees, Fruit, coral	✓	✓					✓	✓		✓	✓		✓	✓
Cape Ivy					✓									
Crofton Weed				✓			✓		✓					
Willow						✓				✓				
Xanthium species	✓			✓			✓							✓
Exotic vines														
Acacia, Robinia														
Opuntia sp.	✓			✓		✓	✓	✓		✓				✓
Tree of Heaven		✓		✓			✓	✓						
LSF Grass, Pampas grass				✓	✓		✓			✓				✓
Aquatic weeds				✓			✓	✓		✓				✓
St Johns Wort	✓			✓			✓	✓						
Mother of Millions				✓			✓	✓		✓	✓		✓	✓
Wild tobacco Green Cestrum				✓										
African olive	✓						✓			✓				
Whiskey grass							✓			✓				
Coolatai grass							✓			✓				
Watsonia lily	✓						✓	✓			✓		✓	✓
Garden bulbs														

8.3 Area Vertebrate Pest Control Priorities

C = Critical H = High M = Medium L = Low

	Wild Dog	Fox	Feral Pig	Rabbit	Horse Cattle	Goat	Deer	Cat
LAKES AREA								
Munmorah SCA		H		M				L
Bird Island NR								
Colongra Swamp NR		M						L
Lake Macquarie SCA		H		M				L
Moon Island NR								
Pulbah Island NR		L						
Tingara Heights NR		L						L
Tuggerah NR and SCA		H	C	L		H		L
Watagans NP	H	C				H		L
Wallarah NP		H		M				L
Wyrrabalong NP		C		L				L
Jilliby SCA	M	L					L	L
Sugarloaf SCA	H	L						L
YANGO AREA								
Dharug NP	H	C						L
Finchley AA	H	H						
Parr SCA	H	C			H		M	H
Popran NP	M	C					M	L
Yengo NP	M	C	L	L	H	L	M	H
GOSFORD AREA								
Bouddi NP	L	M					M	L
Brisbane Water NP	H	H		L		L	C	L
Cockle Bay NR		H						L
Howe AA							C	L
Mooney Mooney AA								L
Pelican Island NR		C						L
Riley's Island NR		C						L
Wamberal Lagoon NR		M						L
Wambina NR	M	M		L				L
Saratoga Island NR		H						L
Palm Grove NR	M	M						L
HUNTER RANGE AREA								
Wollemi NP	C	C	H	L	M		M	M
Yengo NP	M	M	M	L				
Mt Royal NP	C	C						M
Werekata NP	H	H	M	L			M	M
Manobalai NR	C	H		L				M
Belford NR	M	M		L				M
Appletree AA					L			

8.4 Area Weed Control Priorities

C = Critical H = High M = Medium L = Low

	Bitou Bush	Lantana	Blackberry	Asparagus species	Bridal Creeper	Privet trees, Fruit, coral	Cape Ivy	Crofton Weed	Willow	Xanthium species	Exotic vines	Acacia , Robinia	Opuntia sp.	Tree of Heaven	LSF Grass, Pampas grass	Aquatic weeds	St Johns Wort	Mother of Millions	Wild tobacco Green Cestrum	African olive	Whiskey grass Coolatai grass	Watsonia lily Garden bulbs
LAKES AREA																						
Munmorah SCA	C	L	H			M				L	M										L	L
Bird Island NR	C																					
Colongra Swamp NR	L	L											M									
Lake Macquarie SCA	H	M	L	M		L		M			M					H		L			L	
Moon Island NR													L									
Pulbah Island NR	M	M		M									L									
Tingara Heights NR		L				L		L														
Tuggerah NR and SCA	M	M	M	L		M		L		L					L	H+		M	M			M
Watagans NP		H	L					M							L			M	M			L
Wyrrabalong	C	H	L	M	M			L			H		L			H+						M
Jilliby SCA													L								L	
Wallarah NP	C	M				L	L				L		L									
Sugarloaf SCA		?	?	?							L		L									
YANGO AREA																						
Dharug NP		H	H	L	C			L			C			H	H			M			L	
Finchley AA																						
Parr SCA		L	M	M											H							
Popran NP		H	L			H		H			L										L	
Yengo NP		H	H						H	L	M	L	M	C		H	H	M	H			

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	Bitou Bush	Lantana	Blackberry	Asparagus species	Bridal Creeper	Privet trees, Fruit, coral	Cape Ivy	Crofton Weed	Willow	Xanthium species	exotic vines	Acacia , Robinia	Opuntia sp.	Tree of Heaven	LSF Grass, Pampas grass	Aquatic weeds	St Johns Wort	Mother of Millions	Wild tobacco Green Cestrum	African olive	Whiskey grass Coolatai grass	Watsonia lily Garden bulbs
GOSFORD AREA																						
Bouddi NP	C	H	L	M	L	L	L	L			L	L	L		L			L				L
Brisbane Water NP	L	M	L					L				L						L			L	L
Cockle Bay NR		H	M	L	L	L		L	L		M							L	L			L
Howe AA																						
Mooney Mooney AA																						
Pelican Island NR	M	L	L	M	M	L												L	L		L	L
Riley's Island NR	M	H	L	M	M	L													L		L	L
Wamberal Lagoon NR	C	H	L	M		L		L		L								L	L			L
Wambina NR	L	H	L	L		L		L		L	L								L			L
Saratoga Island NR	L	L																				
Palm Grove NR		M	L								L								L			
HUNTER RANGE AREA																						
Wollemi NP		H	H	M	M	L	H		L	L	L	L	M	H			M	H	H			
Yengo NP		H	H		M	L						L	M			C						
Mt Royal NP								H														
Werekata NP		M	M		M	L		L		L				L	M			H	H			
Manobalai NR													M									
Belford NR		L											M					M		H		
Appletree AA																						

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 include measures to verify the results of research being undertaken in order 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.

Reports and anecdotal information from Park neighbours and the general public should not be discounted as part of the monitoring process and evaluating the success of a control program. Although not scientific in nature, such reports can be useful in evaluating the success of a program when other resources and methods are limited e.g. reports that stock losses due to wild dog attack have diminished after a wild dog baiting program

10 Regional coordination and support of pest control programs

Pest control programs are coordinated by the Area in order to ensure that resources are utilised to achieve the best possible outcomes. Area and Regional assistance is used to efficiently work with neighbours, community groups and other agencies.

Area staff utilise the Region's two Pest Management Officers to assist and provide technical strategic support on appropriate methods of pest management. The Pest Management Officers (PMOs) assist in planning, implementing and advising Areas pest management programs including best practise and implementation techniques. They report to the Regional Operations Coordinator but often work with Area staff in planning pest programs and refining methods and implementation.

The region has two Bushcare Coordinators allocated to The Lakes and the Gosford Areas. Their role is to work with the Area staff and volunteer groups on bush regeneration projects; they also administer and implement the Bitou Bush TAP project.

The regional Biodiversity Officer provides specialist support to Areas for species identification, pest control programs, and is the coordinator of the Fox TAP.

11 Pest Program Overviews

The following six pest species have been identified as Regional priorities for management within in the CCHR Region.

11.1 Pest Animal Priorities

11.1.1 Wild dogs (Canis spp) – Critical classification

Distribution and abundance

Wild dogs, Dingo and hybrids are considered to be one of the same for the purpose of distribution and impact.

Dingo populations (if recorded) are managed separately. Wild dogs are recorded in Watagan, Brisbane Water, Wollemi, Yengo, Mt Royal, Werekata, Dharug, Popran, Bouddi NPs, Manobalai Wambina and Palm Grove NRs and Parr, Jilliby and Sugarloaf SCAs.

Impacts

Wild dogs have the ability to cross breed with dingoes, thus putting any residual dingo population under threat from hybridisation.

Wild dogs predate on native fauna including endangered species. Their preference appears to be for some of the larger wallaby species, particularly swamp wallaby. Wild dogs contribute significantly to stock losses, particularly sheep and young calves and have the ability to be a host for hydatid tape worms that effect sheep and cattle. They are a declared Pest Animal under the *Rural Lands Protection Act 1998.*

Management Objectives

All wild dog programs require cooperation with neighbours and a landscape approach to the implementation of programs. Wild dog programs will be consistent with plans developed in association with RLPBs.

Priorities for control

- Priority for control will be in agricultural areas adjacent to reserves.
- In Reserve areas that are **not** under Schedule 2 of the *Rural Lands Protection Act*, eradication (i.e. continuously suppress and destroy) will also be undertaken.

- In Schedule 2 areas, Wild Dog Management Plans, written in conjunction with the local Rural Lands Protection Board, will determine the extent of control. At this stage there are a number of RLPB Wild Dog Management Plans in draft form. NPWS will continue to work with RLPBs on the further development of these plans.

Control Techniques

Integrated control programs will be used to manage wild dog issues in the region.
Strategic control programs will include:

- Conducting 1080 baiting programs along perimeter reserve/neighbour boundaries, in areas that are accessible by vehicle.
- Trapping, using soft jaw leg hold traps.
- Opportunistic shooting is an option, but is seldom used.
- Strategic aerial baiting of wild dog populations will be considered.

Most baiting programs are combined and cooperative programs with the local Rural Lands Protection Board and local Wild Dog Control Associations.

Monitoring

NPWS will conduct independent control programs in areas where it is known that threatened fauna is at risk of wild dog predation. Sand pad monitoring will be undertaken as part of the fox TAP project.

RLPBs collect reports of wild dog activity and stock losses from landholders and a copy of that information is sent to NPWS so that program planning can be conducted. NPWS will also send wild dog reports and results of wild dog control programs to the local RLPB so they in turn can evaluate control measures.

11.1.2 European Red Fox (Vulpes vulpes) – Critical classification

Distribution and abundance

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

Foxes occur throughout the Central Coast Hunter Range Region, in both urban areas and bushland reserves. Urban and semi-urban areas have relatively high fox densities (16 - 20 foxes / km2) compared with rural areas (3.5 - 7 foxes / km2).

Impacts

The introduction of foxes into Australia has had a devastating impact on native fauna, particularly among medium-sized (450-5000g) ground-dwelling and semi-arboreal mammals, ground-nesting birds and freshwater turtles. Recent studies have shown that predation by foxes continues to suppress remnant populations of many such species. Foxes have also caused the failure of several attempts to reintroduce native fauna into areas of their former range. Predation by foxes was the first *key threatening process* to be listed under the NSW *Threatened Species Conservation Act*. Foxes are also significant predators of domestic stock including lambs and poultry. Predation by foxes has the potential to reduce lambing rates significantly. Foxes eat a large variety of food including fruits, aquatic animals and insects, and have been possibly responsible for the local decline of some frog species. Foxes play a roll in the spread of weed such as blackberries and sweet briar, whose seed is spread in droppings after the fruit is eaten.

The native species most likely to be impacted at the population level in CCHRR include brush tailed rock wallaby, ringtail and Brushtail possums, swamp wallabies, long-nosed bandicoots and ground-nesting birds such as superb lyrebirds. Foxes also pose a threat to bush-stone curlew that nest in coastal area. However, the species of greatest concern

are the brush tailed rock wallaby and burrowing bettong, listed as endangered under the TSC Act, these two species are distributed patchily through Wollemi, Yengo, Mt Royal, Dharug and Watagans National Parks. Despite their low numbers, these threatened populations are some of the most significant in NSW.

Management objective

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

Priorities for control

- Brush-tailed rock wallaby populations in Yengo, Wollemi, Watagans and Dharug have been identified as priority sites in the NSW Fox Threat Abatement Plan.
- The Bettong population in Mt Royal has also been identified as a priority site in the NSW Fox Threat Abatement Plan.
- Fox control programs will also be conducted in Munmorah, Lake Macquarie, Tuggerah and Parr SCAs, Brisbane Water, Werekata and Wallarah NPs, and a number of NRs.

Control Techniques

Intensive broad-area 1080 baiting is undertaken within identified areas; this is supplemented by buffer control undertaken on private land surrounding the colony sites.

Management of foxes in the urban interface is difficult, due to the proximity of residences and the potential impact on non-target species. A cooperative landscape program with various land management agencies is the preferred method.

Monitoring

The impact of fox predation on brush tail rock wallaby populations is being assessed through long-term monitoring program of brush tail rock wallaby and fox populations. Wallaby populations measured biannually via live trapping and scat counts. Fox and other medium-sized mammal populations are measured biannually via track counts on sand pads. Fox scats are analysed to determine prey species in coastal areas. All data is analysed by the Pest Management Unit and published periodically as part of the review of the Fox Threat Abatement Plan.

11.1.3 European Rabbit (Oryctolagus cuniculus)) – High classification

Distribution and abundance

Rabbit populations are disjunct throughout the region. Rabbits prefer soft and fertile soils with short grass cover and a ready source of shelter. These conditions are present in small areas such as the picnic grounds at Munmorah SRA and Werekata NP and SCA.

There are low to medium density populations in small areas of Munmorah and Lake Macquarie SCAs, Wallarah, Wyrrabalong, Brisbane Water, Yengo, Wollemi, Werekata NP and SCA, and Manobalai and Belford NRs.

Impacts

Rabbits contribute to soil erosion and disturbance from burrowing which can change the nature of the landscape, their digging activates also scratch out seedlings and damage root systems. They also graze on native plants, grasses and herbage, and compete with native animals for food. The resultant habitat degradation in turn affects native fauna, which may also be impacted rabbits through competition for food and shelter.

Rabbits are also a food source for foxes and cats, maintaining high numbers of these introduced predators in turn impacts on native prey species.

Rabbits have been identified as a Key Threatening Process under the TSC Act and are a declared pest in all of NSW under the RLPB Act.

Management Objective

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

Priorities for Control

- Control programs will be implemented in areas where grazing or burrowing is causing damage to recreational facilities.
- Control programs in urban areas along reserve boundaries will be undertaken in consultation with local authorities and neighbours.

Control Techniques

The regions main control techniques are shooting, exclusion fencing, poisoning with 1080 or pindone or biological control. Other control options include digging out / in, harbour destruction, exclusion fencing and fumigation.

Wherever possible integrated pest management techniques will be used rabbit control.

Monitoring

The highest rabbit populations in CCHR Region occur in visitor areas, monitoring of populations on a regular seasonal basis will be undertaken.

11.2 Weed Priorities

11.2.1 Bitou Bush (Chrysanthemoides monilifera)) – Critical classification

Distribution and abundance

Bitou Bush is a very common weed and is well established in Munmorah, Lake Macquarie SCAs, Wyrrabalong and Bouddi NPs, Moon Island, Pulbah, and Wamberal Lagoon NRs. There are scattered infestations throughout Wallarah NP and Rileys Island NR. Small infestations occur in Brisbane Water NP and Pelican Island, Wambina and Saratoga NRs.

Impacts

Bitou bush is a highly competitive weed that smoothers native plant communities and destroys native habitat and food sources for native animals. It threatens over 180 species of native plant, populations and ecological communities in NSW. Bitou invades dunes, coastal heathlands, grasslands, woodlands and forests. The weed was originally planted as an aid to combat beach and sand dune erosion.

Bitou bush is a Weed of National Significance, and is declared Class 4 under the *Noxious Weeds Act 1993* for the three coastal councils of Gosford, Wyong and Lake Macquarie. The invasion of native plant communities is listed as a key threatening process under the *Threatened Species Act 1995*, and a Threat Abatement Plan (the Bitou TAP) has been prepared.

Management Objectives

Implement Bitou control in all affected areas in accordance with regional Priority Action Statements, focussing on reduction of weed distribution particularly to threatened species and native plant communities.

Priorities for control

There are 19 PASs for Bitou control within CCHRR. Control programs have commenced in the following areas:

- Bouddi NP - targeting Grassy Headlands, coastal floodplains, Littoral Rainforest areas.
- Wamberal Lagoon NR - Littoral Rainforest, coastal floodplains.
- Wyrrabalong NP - Grassy Headlands, Grassy Headlands, Littoral Rainforest, Swamp Sclerophyll forest, and in particular - *Diuris praecox*, *Eucalyptus camfieldii* and *Syzygium paniculatum*

- Wallarah NP -, Grassy Headlands, and in particular -*Tetratheca juncea, Diuris praecox,* and *Pultenaea maritime*
- Lake Macquarie SCA - Littoral Rainforest, and in particular *Eucalyptus camfieldii,*

Control Techniques

Best practise guidelines recommend an integrated approach spanning 3-5 years with the final combination of control treatments being site specific. A combination of techniques including physical removal, herbicide use, fire, biological control and revegetation has been successfully used in the region, the main control measures have been herbicide application using helicopter and ground based foliar application. Trial work is currently underway using a splatter gun with high concentration, low volume application rates.

Support will continue to be given to volunteer groups such as Dunecare. The role of the Bush Regeneration Coordinator is vital in this effort.

Approved biological controls, when available, will be released under the appropriate guidelines.

Monitoring

Bitou bush density and distribution mapping was undertaken in the coastal reserves in 1997/1998, and subsequently verified for distribution over the ten year period. This mapping data will also provide information regarding the long term effectiveness of control programs.

The region also monitors the success of control programs at three sites in Munmorah, Wallarah and Wamberal Lagoon using methods outlined in the Bitou Bush TAP monitoring guidelines. Data on Bitou density abundance and native species presence, is collected annually from these nest quadrates.

11.2.2 Lantana (Lantana camara) – High classification

Distribution and abundance

Lantana is a common weed in the Central Coast and the Hunter Valley. Small infestations of the weed exist in all coastal reserves and scattered infestation appears in the more western reserves, particularly along the Putty Road and in the Watagans.

Some of the new additions and proposed additions to the regional reserve system are particularly vulnerable to lantana infestations.

In the frost prone sections of Wollemi Creek lantana is winter deciduous, where as in frost free areas it is an evergreen.

Lantana is an aggressive plant which invades disturbed areas; favourite habitat is usually along the edges of roadways and fire trails, it is readily spread by seeds carried by birds and foxes.

Impacts

Lantana readily invades disturbed areas and forest margins, healthy bushland and riparian areas in frost free areas. It can devastate bushland by shading out native vegetation and preventing regeneration occurring, both physically and chemically, by altering soil chemistry and nutrient cycles. Dense mono-specific stands are impenetrable to people and can pose a fire hazard. Lantana is toxic to both humans and animals.

Lantana is listed as a Weed of National Significance, and a Control Class 5 weed under the *Noxious Weeds Act 1993* for all local council areas in the region.
Concern about the impacts of lantana has led to the NSW Scientific committee listing invasion, establishment and spread of lantana as a Key Threatening Process under the TSC Act.

Management objectives

A Lantana Threat Abatement Plan for NSW is currently being prepared. Expected outcomes will be Priority Action Statements focussing on reduction of weed distribution particularly to threatened species and native plant communities.

Control Priorities

Regional PAS lists a number of species which benefit from lantana control:

- Hunter Lowland Redgum Forest Ecological community, Long-nosed Potoroo and *Melaleuca biconvexa.*
- Areas with established infestations for a high priority for control are: Watagans, Bouddi NPs and Wamberal and Wambina NRs.
- Areas with scattered infestations for high priority for control are: Wyrrabalong NP and Rileys Island NR.
- Areas with isolated infestations for high priority for control are: Dharug, Popran, Yengo and Wollemi NPs.

Control Techniques

Control methods include herbicide application, hand removal, mechanical removal, fire and a combination of all of the above. There is currently research and releases of biological agents, but their effect in CCHR Region is not yet evident.

Recent trial in this region and on the mid north coast indicate that the low volume –high concentration application of herbicide through a splatter gun is much more target specific and caused less off target damage than conventional spraying techniques. Trial work should continue with this method.

In coastal areas lantana control is generally part of site specific bush regeneration programs. Regular spraying programs will be scheduled into summer works programs.

Monitoring

Systematic mapping of infestations will continue particularly for the new reserves.
The splatter gun control method will continue to be monitored and results compared with conventional foliar spray methods.

Any available biological control methods should be investigated with a view to release.

11.2.3 Blackberry (Rubus spp) – High classification

Distribution and abundance

Blackberry infestations occur in most of the reserve areas including Wollemi NP, Yengo NP (particularly Big Yango Station), Popran, Watagans, Dharug, Bouddi NPs and Cockle Bay NR. Land acquisitions, that have often sustained an agricultural enterprise in the past, continue to add infestations to the reserves .

Impacts

Blackberry can thrive in a range of habitat and invades the banks of watercourses, roadsides, open forest and is often associated with previous agricultural disturbance. It can establish large thickets that are difficult to access and provides ideal harbour for rabbits and foxes. Blackberries can spread from the stems which root into the ground and through seed dispersal by animals.
Blackberry is listed as a Weed of National Significance, and is declared Class 4 under the *Noxious Weeds Act 1993* for all local council areas in the region.

Management Objective

Blackberry infestations that impact on threatened species will be a priority.

Control Priorities

Regional PAS lists a number of species which benefit from lantana control:

- *Diuris praecox, Melaleuca biconvexa* and the Hunter Lowland Redgum Forest Ecological community
- Areas with established infestations for a high priority for control are: Yengo and Wollemi NPs.
- Areas with scattered infestations for high priority for control are: Dharug and northern Yengo NPs.
- Areas with isolated infestations for high priority for control are: Munmorah SCA.

Control Techniques

Much of the control work to date has been by conventional ground based herbicide application.

A newly developed helicopter application method that directly targets individual plants is proposed to be used at Big Yango Station in the near future. Helicopter long line spot application and the use of splatter guns for remote infestations will significantly add to control in inaccessible areas.

Though there are several types of biological control options available, in the form of a rust fungus, their effect has been minimal. This less than satisfactory result could be attributed to the recent drought. New biological control options will continue to be investigated with a view to release where viable.

Areas will schedule regular control programs over the summer months. These control programs often target both blackberry and lantana which often grow together and can be treated at the same time.

Monitoring

Areas will continue to report and map infestations and assess their impact on high conservation values.

CCHR Region will continue to work closely with the various weeds control authorities, and volunteer groups to encourage regeneration projects.

12 Regional Pest Programs 2001 – 2006

The following tables show the pest programs completed over the last five years on both vertebrate pests and weeds. The table indicates the number of individual pest programs undertaken for each pest species within the reserves, and the frequency programs were undertaken.

12.1 Vertebrate Pest Control Programs 2001- 2006

Less than Annually - **LA** Annually - **A** Seasonally - **S** Constantly - **C**

	Wild Dog	Fox	Feral Pig	Rabbit	Horse Cattle	Goat	Deer	Cat	Black Rat
LAKES AREA									
Munmorah SCA				**S10**					
Bird Island NR									
Colongra Swamp NR									
Lake Macquarie SCA		**LA2**		**S4**					
Moon Island NR									
Pulbah Island NR									
Tingara Heights NR									
Tuggerah NR and SCA (Gazetted Feb 07)			**LA1**						
Watagans NP	**C25**	**C25**							
Wallarah NP		**LA3**		**S5**					
Wyrrabalong NP									
Jilliby SCA	**A4**	**A4**							
Sugar Loaf SCA (Gazetted 1.7.07)									
YANGO AREA									
Dharug NP	**A5**	**A5**						**A5**	
Finchley AA									
Parr SCA	**A5**	**A5**			**LA2**		**LA1**		
Popran NP	**A3**	**A3**							
Yengo NP	**A4**	**A1**			**LA5**	**LA1**		**LA4**	**C5**
GOSFORD AREA									
Bouddi NP		**A3**					**A3**		
Brisbane Water NP	**A3**						**LA1**		
Cockle Bay NR		**LA1**							
Howe AA									
Mooney Mooney AA									
Pelican Island NR		**LA2**							
Riley's Island NR		**LA2**							
Wamberal Lagoon NR									
Wambina NR									
Saratoga Island NR									
Palm Grove NR									
HUNTER RANGE AREA									
Wollemi NP	**C15**		**LA2**		**LAI**				
Yengo NP	**C30**	**C30**	**LA1**						
Mt Royal NP	**C30**	**C34**			**LA1**			**A4**	
Werekata NP	**S8**	**S8**							
Manobalai NR	**A5**	**A5**							
Belford NR	**A5**	**A5**							
Appletree AA									

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12.2 Weed Control Programs 2001 - 2006

Less than Annually **- LA** Annually **- A** Seasonally **- S** Constantly **- C**

	Bitou Bush	Lantana	Blackberry	Asparagus species	Bridal Creeper	Privet trees, Fruit, coral	Cape Ivy	Crofton Weed	Willow	Xanthium species	Exotic vines	Acacia , Robinia	Opuntia sp.	Tree of Heaven	LSF Grass, Pampas grass	Aquatic weeds	St Johns Wort	Mother of Millions	Wild tobacco Green	African olive	Whiskey grass Coolatai grass	Watsonia lily Garden bulbs
LAKES AREA																						
Munmorah SCA	**C71**	**LA2**	**LA4**	**LA3**				**LA2**			**LA2**											
Bird Island NR																						
Colongra Swamp NR																						
Lake Macquarie SCA	**C140**	**C25**	**S4**	**LA4**				**S2**			**C25**		**LA2**			**S4**						
Moon Island NR																						
Pulbah Island NR	**A12**	**A12**		**LA2**							**A12**											
Tingara Heights NR		**LA2**						**LA2**														
Tuggerah NR and SCA	**A4**	**A4**	**LA1**						**LA1**	**LA2**					**LA1**	**S1**						
Watagans NP		**LA7**						**LA7**											**LA7**			
Wyrrabalong	**C66**	**C62**		**LA3**	**LA3**						**LA3**				**LA1**							
Jilliby SCA		**LA2**						**LA2**														
Wallarah NP	**LA7**	**LA7**		**LA2**				**LA3**							**LA2**				**LA2**			
Sugarloaf SCA (Gazetted 1.7.07)																						
YANGO AREA																						
Dharug NP		**S6**	**S2**	**S4**	**C**	**LA1**					**C**			**S1**	**LA2**			**LA1**	**S4**		**LA1**	
Finchley AA																						
Parr SCA												**LA5**										
Popran NP								**LA5**														
Yengo NP		**LA2**	**A20**						**A5**				**A10**	**A4**					**A4**			
GOSFORD AREA																						
Bouddi NP	**C50**	**C30**	**LA4**	**C50**	**LA3**	**S1O**		**A5**			**C10**	**LA5**			**LA2**			**A5**	**A10**			**A10**
Brisbane Water NP	**LA3**	**C15**	**LA3**	**LA**		**LA3**		**LA3**			**LA3**							**LA2**	**A5**		**LA3**	
Cockle Bay NR		**C30**	**S10**	**A5**	**A5**	**S10**		**A5**	**LA3**		**C15**							**LA3**	**A5**			**S10**
Howe AA																						

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	Bitou Bush	Lantana	Blackberry	Asparagus species	Bridal Creeper	Privet trees, Fruit, coral	Cape Ivy	Crofton Weed	Willow	Xanthium species	exotic vines	Acacia , Robinia	Opuntia sp.	Tree of Heaven	LSF Grass, Pampas grass	Aquatic weeds	St Johns Wort	Mother of Millions	Wild tobacco Green Cestrum	African olive	Whiskey grass Coolatai grass	Watsonia lily Garden bulbs
Mooney Mooney AA																						
Pelican Island NR	**LA3**	**LA5**		**C10**	**C10**													**LA3**				
Riley's Island NR	**A5**	**A5**	**S5**	**C15**	**A5**	**S5**									**A10**						**LA4**	**S5**
Wamberal Lagoon NR	**C80**	**C35**	**S5**	**C35**				**LA3**			**A5**							**LA3**	**A5**			**S5**
Wambina NR		**C20**	**S5**	**LA4**		**S8**		**A5**			**A5**								**C20**			**S5**
Saratoga Island NR																						
Palm Grove NR																						
HUNTER RANGE AREA																						
Wollemi NP		**S5**	**S10**			**LA3**							**LA2**	**LA3**				**S7**	**LA2**			
Yengo NP			**S8**																			
Mt Royal NP								**A4**														
Werekata NP			**A5**												**LA2**			**A5**		**LA1**		
Manobalai NR													**LA2**									
Belford NR																		**S3**				
Appletree AA																						

Less than Annually **- LA** Annually **- A** Seasonally **- S** Constantly **- C**

APPENDIX 1: Emerging Pest Issues

There are a number of introduced, flora and fauna species, which are emerging as potential threats to the reserve system in the CCHR Region. Many of these species are not as yet declared pests under any NSW Legislation.

They do however have the ability, given sufficient numbers and suitable condition to breed, proliferate and spread, to become major pests and at times threaten biodiversity.

Pest Animals

1. Cane Toad *Bufo marinus*

Isolated individual animals have been brought to NPWS staff for identification, fortunately only a few have been confirmed as cane toads. These individuals were generally carried to the Central Coast by transport trucks in cargo from northern NSW or Queensland. Investigations concluded that they are not part of a local breeding colony.

Cane toads have the potential to spread and infest many parts of the Central Coast with well documented and researched devastating effect on local fauna.
Positive cane toad identification will lead to the humane destruction.

2. Deer

There are three species of deer present in the CCHR. Fallow deer appear to be the most prevalent species with reported sightings along the Putty Road, Bouddi NP, Brisbane Water NP, Popran NP, Jilliby NP and Werekata NP. Rusa deer have been reported at Brisbane Water NP and Red Deer in Wollemi NP.

All deer are either escapees, or descendants of escapees, from nearby deer farms that either accidentally escaped, or more likely were deliberately released from captivity.

Male deer can be excessively aggressive during the mating season and pose a risk to park users, neighbours agricultural enterprises and NPWS staff. They have been recorded as a major cause of motor vehicle accidents particularly along the Putty Road.

A significant deer population can cause major damage to fragile protected areas. Plans will be developed to control deer in CCHR

3. Plague Minnow *Gambusia holbrooki*

Gambusia, or mosquito fish are small fish, a native of northern and central America. Their proliferation around the world is associated with the attempt to control human disease, particularly malaria, by controlling mosquitoes.

Predation by Gambusia has been listed as a key threatening process, as the prey upon eggs and tadpoles of the Green and Golden Bell Frog.

Pest Weeds

1. Arum Lilly *Zantedescdia aethiopica*

Arum lily is a native of South Africa. The plant is distinct by its large white flowers and is widely distributed through most of temperate Australia. It is a classic garden escapee.

Arum lily is well established at Riley's Island and Pelican Island. The wet and swampy environment of the islands and surrounding shorelines is an ideal habitat for the weed.

The plant is a prolific seeder and immature plants are inconspicuous, making detection and control difficult. The plant is poisonous, due to the presents of calcium oxalate. Arum lily control so far has been confined to physical removal, but due to the toxic nature of the plant, chemical treatment will be investigated.

2. Radiata Pine *Pinus radiata*

Radiata pine is a tall evergreen tree from North America. It is grown in Australia for the soft wood timber industry. As a number of the reserved lands in CCHR were previously lands used for forestry, many stands of plantation pines or wild seedlings next to plantation pines have been inherited with the recent expansion to the reserve system

Radiata pines do not flower; instead have male and female pine cones. Female pine cones produce a large number of winged seed, which can germinate and grow to new trees. Treatment is by cutting the trunk of the tree at ground level and chemical treatment of the stump is not necessary.

Options for the removal of Radiata pines will be looked into in the life of this Pest Plan.

3. Glory Lilly *Gloriosa superba*

Glory lily is single stemmed perennial belonging to the lily family. It is a native of Asia and Africa, but has become naturalised to most of the coastal areas of NSW. The plant has glossy green leaves with tendrils that assist with its climbing habit. It has vibrant red and yellow flowers. In winter the plant dies back to the tubers. Regrowth persists from the tubers in spring and summer.

Glory lily is present in CCHR Region, particularly in the Lakes area and other coastal reserves. The plant is toxic to both animals and humans and can form dense infestations that can exclude and compete with native species.

Control is either by chemical treatment or hand removal. Care should be taken with hand removal due to the toxic nature of the plant.

4. Narrow Leaf Cotton Bush *Gomphocarpus fruticosus*

Narrow leaf cotton bush belongs to a family of plants that contain many toxic substances. This family of plants contains a thick white sap. The plant is a native of South Africa and Ethiopia and was introduced to Australia as a garden plant and is now regarded as a weed right across Australia. Narrow leaf cotton bush invades previously degraded areas and riparian areas. The plant contains cardiac glycocides that are fatal to stock and humans. Care should be taken if handling this plant. Colonies of this plant are recorded in Watagans NP.

The best form of control of narrow leaf cotton bush is by chemical treatment in the spring and summer months before the fruit forms.

5. African Olive

This woody weed species is an outcome of the olive growing industry. African olive was widely used as a root stock for commercial fruiting olive trees and as garden hedges. The weed is spread generally by birds and foxes in their droppings.

There are reported minor infestations at Belford NR and possibly Werekata NP. The recent proliferation of domestic olive plantations to the north of Yengo and Wollemi NP's indicates that wild African olive may become a serious pest plant of the future.

Any current or new infestations on parks and reserves will be removed as a priority.

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APPENDIX 2: Comparison of vertebrate distribution to priority programs

C = Critical H = High M = Medium L = Low

● 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 incursions)

	Wild Dog		Fox		Feral Pig		Rabbit		Horse Cattla		Goat		Deer		Cat	
LAKES AREA																
Munmorah SCA			●	H			⦿	M								
Bird Island NR															○	L
Colongra Swamp NR			●	M											○	L
Lake Macquarie SCA			●	H			⦿	M							○	L
Moon Island NR																
Pulbah Island NR			○	L												
Tingara Heights NR			●	L											○	L
Tuggerah NR and SCA			●	H	○	C	⦿	L			⦿	H			○	L
Watagans NP	●	H	○	C							⦿	H			○	L
Wallarah NP			●	H			⦿	M							○	L
Wyrrabalong NP			●	C			⦿	L							○	L
Jilliby SCA	○	M	○	L									⦿	L	○	L
Sugarloaf SCA (Gazetted 1.7.07)	●	H	○	L											○	L
YANGO AREA																
Dharug NP	○	H	●	C											○	L
Finchley AA	●	H	●	H											○	L
Parr SCA	○	H	●	C					⦿	H			⦿	M	○	H
Popran NP	○	M	○	C									⦿	M	○	L
Yengo NP	●	M	●	H	⦿	L	⦿	L	⦿	H	⦿	L	⦿	M	⦿	H
GOSFORD AREA																
Bouddi NP	○	L	●	M									⦿	M	○	L
Brisbane Water NP	●	H	●	H			⦿	L			⦿	L	⦿	C	⦿	L
Cockle Bay NR			⦿	H											○	L
Howe AA													⦿	C	○	L
Mooney Mooney AA															○	L
Pelican Island NR			⦿	C											○	L
Riley's Island NR			⦿	C											○	L
Wamberal Lagoon NR			○	M											⦿	L
Wambina NR	○	M	⦿	M			○	L							○	L
Saratoga Island NR			○	H											○	L
Palm Grove NR	○	M	○	M											○	L
HUNTER RANGE AREA																
Wollemi NP	●	C	○	C	⦿	H	⦿	L	⦿	M			⦿	M	⦿	M
Yengo NP	●	M	○	M	⦿	M	⦿	L							⦿	
Mt Royal NP	●	C	⦿	C											○	M
Werekata NP and SCA	●	H	●	H	⦿	M	⦿	L					○	M	○	M
Manobalai NR	●	C	●	H			⦿	L							○	M
Belford NR		M	●	M			⦿	L							○	M
Appletree AA	●		○				⦿		⦿	L						

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APPENDIX 3: Comparison of weed distribution to priority programs

C = Critical H = High M = Medium L = Low

● 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)

	Bitou Bush		Lantana		Blackberry		Asparagus species		Bridal Creeper		Privet trees, Fruit, coral		Cape Ivy		Crofton Weed		Willow		Xanthium species		Exotic vines		Acacia , Robinia		Opuntia sp.		Tree of Heaven		LSF Grass, Pampas grass		Aquatic weeds		St Johns Wort		Mother of Millions		Wild tobacco Green Cestrum		African olive		Whiskey grass Coolatai grass		Watsonia lily Garden bulbs	
LAKES AREA																																														
Munmorah SCA	C	●	L	●	H	⦿					M					⦿		⦿	L		M	●		⦿		⦿				●											L	●	L	⦿
Bird Island NR	C			○																																										
Colongra Swamp NR	L		L	●		○										⦿		⦿							M							⦿													
Lake Macquarie SCA	H	●	M	●	L	⦿	M	⦿			L	⦿			M	⦿					M	⦿				⦿					H	⦿			L	⦿					L	●		
Moon Island NR		●		●		○										○						○			L																			
Pulbah Island NR	M	●	M	●			M	⦿																	L	⦿																			
Tingara Heights NR			L	⦿		○				⦿	L	⦿			L	⦿		⦿				⦿		○										⦿		○								
Tuggerah NR and SCA	M		M	○	M	○	L	⦿			M	○			L	⦿		⦿	L	○		⦿				○		○	L	○	H+	●			M	○	M	○					M	○
Watagans NP			H	●	L	○						⦿			M	⦿				○						○			L						M		M			●			L	
Wyrrabalong	C	●	H	○	L	○	M	●	M	⦿		⦿			L	⦿					H	●			L					○	H+	⦿											M	
Jilliby SCA				⦿		⦿										●									L	⦿															L	⦿		⦿
Wallarah NP	C	○	M	⦿							L		L								L				L																			
Sugarloaf SCA			?	○	?	⦿	?														L				L	⦿																		
YANGO AREA																																														
Dharug NP			H	⦿	H	○	L	⦿	C	⦿					L	⦿					C	⦿					H	⦿	H	⦿					M	⦿		⦿			L	⦿		
Finchley AA																																														
Parr SCA			L	⦿	M	⦿	M	⦿																					H	⦿															
Popran NP			H	⦿	L	○					H	⦿			H	●					L	○																			L	⦿		
Yengo NP			H	⦿	H	○											H	⦿	L	○	M	⦿	L	⦿	M	⦿	C	○		⦿	H	⦿	H	⦿	M	⦿	H	○						

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	Bitou Bush		Lantana		Blackberry		Asparagus species		Bridal Creeper		Privet trees, Fruit, coral		Cape Ivy		Crofton Weed		Willow		Xanthium species		exotic vines		Acacia , Robinia		Opuntia sp.		Tree of Heaven		LSF Grass, Pampas grass		Aquatic weeds		St Johns Wort		Mother of Millions		Wild tobacco Green Cestrum		African olive		Whiskey grass Coolatai grass		Watsonia lily Garden bulbs	
GOSFORD AREA																																														
Bouddi NP	C	●	H	●	L	⊙	M	●	L	⊙	L	⊙	L	⊙	L	⊙					L	⊙	L	⊙	L	⊙			L	⊙					L	⊙		⊙		⊙		⊙	L	⊙
Brisbane Water NP	L	⊙	M	○	L	⊙						⊙			L	●							L	⊙											L	⊙		⊙			L	⊙	L	
Cockle Bay NR			H	●	M	○	L	●	L	⊙	L				L	⊙	L	⊙			M														L	⊙	L	⊙					L	⊙
Howe AA																																														
Mooney Mooney AA																																														
Pelican Island NR	M	⊙	L	⊙	L		M	○	M	○	L																								L	⊙	L	⊙			L	⊙	L	⊙
Riley's Island NR	M	○	H	○	L	○	M	○	M	⊙	L	⊙																									L	⊙			L	⊙	L	⊙
Wamberal Lagoon NR	C	●	H	●	L	⊙	M	○			L				L	⊙			L	○															L	⊙	L	⊙					L	⊙
Wambina NR	L	⊙	H	●	L	⊙	L	⊙			L	○			L	⊙			L	⊙	L	⊙															L	⊙					L	
Saratoga Island NR	L	⊙	L																																											
Palm Grove NR			M	○	L	⊙						○				⊙					L	⊙														L	⊙						
HUNTER RANGE AREA																																														
Wollemi NP			H	⊙	H	○	M	⊙	M	⊙	L	⊙	H	⊙			L	⊙	L	⊙	L	⊙	L	⊙	M	○	H	⊙					M	⊙	H	⊙	H	⊙						
Yengo NP			H	⊙	H	○			M	⊙	L	⊙											L	⊙	M	○					C	⊙												
Mt Royal NP															H	○																														
Werekata NP			M	⊙	M	⊙			M	⊙	L	⊙			L	⊙			L	⊙							L	⊙	M	⊙					H	⊙	H	⊙						
Manobalai NR																									M	⊙																		
Belford NR			L	⊙																					M	⊙									M	○			H	○				
Appletree AA																										⊙																		

C = Critical H = High M = Medium L = Low

● 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)

APPENDIX 4: Consultation process for Regional Pest Management Strategies

Internal consultation

All relevant staff have been involved in the development of this regional strategy.

Review existing strategies

As a first step, existing pest strategies in the region have been reviewed. These strategies include:

- the existing Regional Pest Management Strategy;
- the weed and pest animal sections of relevant Catchment Action Plans;
- Local council weed (and where they occur) pest animal plans;
- Pest animal plans for the local Rural Lands Protection Board;
- Other relevant plans.

This review will help identify local/regional priorities for pest animal and weed control

Hold Area workshops

To gain ownership of the regional strategy, all relevant staff, especially Area Managers, have been involved in its preparation. Each Area in the Region has been consulted with both personally and electronically.

Discussions with the Areas reviewed pest animal and weed programs within each Area. The status of each pest and weed program was discussed and Area-wide priorities, in accordance with the criteria, identified for inclusion in the strategy.

Preparation of an initial draft strategy

After completion of the consultation, the Pest Management Officer, should prepare a draft strategy based on the state-wide template and the priorities developed at the workshops. Copies of the draft regional strategy should then be circulated to all Area Managers and the Regional Operations Coordinator for comment.

Comments should also be sought from key stakeholder group contacts (for example, local RLPB rangers and Council weed officers) and the Regional Advisory Committee before a revised draft is prepared. The draft needs to be endorsed by the Regional Manager and Branch Director before the strategy is released for public comment.

Public consultation

Release of draft Regional Pest Management Strategy for public comment

A copy of the draft strategy should be made available for public comment for a period of six weeks. The procedure for doing this may vary from Branch to Branch but as a guide should involve the following:

- posting on the NPWS web site
- making a hard copy available in appropriate Regional and Area offices
- send hard copies to key stakeholders including, but not restricted to, relevant local councils, RLPBs, CMAs, the NPWS Regional Advisory Committee; other key stakeholders in the Region.

Revise and prepare final Regional Pest Management Strategy

Prepare the final strategy to address useful comments made during the public exhibition process. Final copies are to be approved by the Regional Manager and Branch Director.

Distribution of copies

The number of copies to be printed will vary from region to region but the following should receive a hard copy by direct mail:

- Branch Director
- Regional Manager
- All Area Managers in the region
- all Rangers in the region
- Regional Operations Coordinator,
- Regional Pest Management Officer,
- each library within the region,
- PWD library in Hurstville,
- Pest Management Unit in RWC Branch at Hurstville;
- each member of the NPWS Regional Advisory Committee
- one copy to each local council in the region
- one copy to each RLPB in the region
- one copy to each CMA in the region
- Copies to other key stakeholder groups.