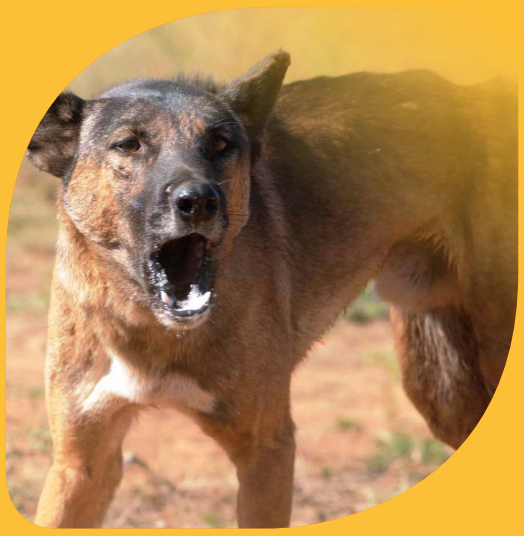
Hunter Regional Strategic Pest Animal Management Plan

2018 - 2023



NSW GOVERNMENT

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Hunter Regional Strategic Pest Animal Management Plan 2018-2023

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Ministers Foreword

I am pleased to announce the Hunter Regional Strategic Pest Animal Management Plan. This plan is a vital community tool, as it provides a strategic regional approach to improving the coordination and delivery of on ground, nil tenure pest animal management activities for terrestrial vertebrate and freshwater aquatic pest species in NSW.

The Hunter Regional Strategic Pest Animal Management Plan is an excellent example of how local communities can work together to protect the environment, community and economy from the negative impacts of pest animals and to support positive outcomes for our landscapes and ensuring we maintain a bio-secure environment.

The Hunter Regional Strategic Pest Animal Management Committee represents major land uses and relevant economic, environment and community representatives for each region. The committee delivers a collaborative approach to setting regional priorities and is integral to the ongoing effective delivery of pest animal management outcomes in the region.

This plan is a product of extensive collaboration and engagement across numerous stakeholders involved in pest animal management. It will continue to grow and evolve with the changing environment and is an excellent framework to contribute to the delivery of improved coordinated pest animal management in NSW.

The Hon. Niall Blair MLC Minister for Primary Industries,
Minister for Regional Water, and Minister for Trade and Industry

Executive Summary

Why a plan?

Pest animals have a significant economic impact on primary production and pose a significant threat to threatened species and ecological communities. Deer and wild horses have become a significant risk to human safety, with several road fatalities in recent years. Wild dog attacks on livestock and pets, lethal or not, cause emotional distress to landholders and threaten economic viability, human health, safety and wellbeing. Pest animals like feral pigs are vectors for disease and foxes and cats have a big impact on our native fauna.

A pest means different things to different people, depending on the impact an animal has on their livelihood, lifestyle or wellbeing and their beliefs about an animals presence and behaviour. A problem animal for some, may be an unknown problem or desirable resource to another. These differing views have contributed in part to some pest animals increasing in number and extent. As a result of increasing urbanisation (especially in the Lower Hunter) more communities are being affected by pest animals.

What is the plan about?

This Plan outlines how Government, industry and the community can work together and share the responsibility to eradicate, contain or manage pest animals to achieve a balance in economic, environmental and social outcomes. The plan aims to:

- Reduce the negative impacts of pest animals on public safety, primary production and biodiversity
- Co-ordinate cross tenure partnerships for managing pest animals
- Provide clarity to landholders on their obligations and support landholders to undertake co-ordinated control
- Co-ordinate local scale pest management planning that is best practice
- Deliver long term proactive pest management programs
- Support research into new control techniques
- Support timely and effective management of new risks and incursions

The mix of land uses in the region makes a tenure neutral and co-ordinated approach essential for effective pest management. The region also borders six other LLS regions, making cross regional collaboration essential for prevention and effective pest management.

What should I do?

Section 5 of the plan provides information for all landholders on priority pest species, what is expected of all landholders in managing these pest species and the strategic actions to manage them.

Species that present a threat to the region but aren't known to be present, are listed in section 1.7 (including pictures). Land managers and community members can stop these species from becoming established by reporting anything unusual or suspicious as soon as possible.

It's important landholders participate in coordinated programs, stay informed and undertake activities that reduce risks from pest animals, on land under their care and control.

Implementing the Plan

This plan provides the overall strategic direction for managing pest animals in the region, with wild dog management plans and other operational plans determining the programs implemented in a given year. Key stakeholders and the community will play an important role in implementation and partnerships with local government and community groups will be especially important in managing pest species in the urban/peri urban environment and improving public safety. Collaboration with neighbouring regions will be undertaken for effective pest management and prevention in the region.

1. Introduction

1.1 Overview

- The economic impact of wild rabbits, carp, feral pigs, foxes, wild dogs, wild deer, feral goats and introduced birds has been estimated at $170 million in NSW annually.
- Pest animals pose significant threat to threatened species and ecological communities, with feral pigs alone impacting on 361 species and ecological communities listed as nationally threatened.
- Under the NSW Biosecurity Act 2015, all community members have a general biosecurity duty to prevent, minimise or eliminate any biosecurity risk. The general biosecurity duty is a principle that can be used by the community, landholders, Government and industry to implement best practice behaviours to achieve effective pest animal management.

1.2 Purpose of the plan

The overall purpose of the Regional Strategic Pest Animal Management Plan (RSPAMP) is to work together to protect the environment, community and economy from the negative impacts of pest animals to support positive outcomes for biosecurity and sustainable landscapes. The plan supports regional implementation of the NSW Biosecurity Act 2015 and NSW Biosecurity Strategy and is reflective of key aligning themes including:

- Improved community engagement in biosecurity management
- Improved identification, diagnostic, surveillance, reporting and tracing systems for pests, diseases and weeds.
- Increased numbers of well trained and resourced people

This plan is one of eleven RSPAMPs across NSW. It presents a clear vision by identifying regional priorities for pest animal management and outlines how Government agencies, community groups and individual landholders will share responsibility and work together across land tenures to prevent, eradicate, contain and manage the impacts of pest animals.

This plan provides guidance on how both public and private land managers can meet their general biosecurity duty and identifies key commitments for pest animal management activities over the life of the plan.

1.3 What is considered a pest animal?

Under the *NSW Biosecurity Act 2015*, pest animals are not defined by species. That is, pest species can be considered as any species (other than native species) that present a biosecurity threat.

Whilst the Act does not define pest animals, there are specific activities that are permitted under the Biosecurity Order (Permitted Activities) that would otherwise be prohibited (such as keeping exotic animals in captivity).

It is the responsibility of individuals to ensure they discharge their general biosecurity duty to manage the biosecurity risks posed by pest animals. The Biosecurity Regulation 2017 will outline mandatory measures for pest animal management in NSW. General control and management of pest animals outlined in this plan can be considered mechanisms for individuals to discharge their general biosecurity duty and landholders and community members should work with stakeholders identified for ongoing implementation of pest animal management practices.

1.4 Managing native animals

Native species are protected by law in NSW and are not covered in this plan. Issues associated with managing the impacts of native species (such as kangaroos, emus, wombats and possums) should be addressed separately in consultation with National Parks and Wildlife Service and having regard to the regulatory requirements of the *Biodiversity Conservation Act 2016.* Non-lethal methods may include exclusion netting, fencing, gating, and olfactory devices. Where it is necessary to use lethal methods such as shooting to destroy native animals because they are a threat to human safety, damaging property and/or causing economic hardship, the National Parks and Wildlife Service can issue a biodiversity conservation licence to harm protected native animals under the *Biodiversity Conservation Act 2016.*

For further information visit http://www.environment.nsw.gov.au/wildlifelicences/OccupierLicences.html

1.5 Framework for pest animals

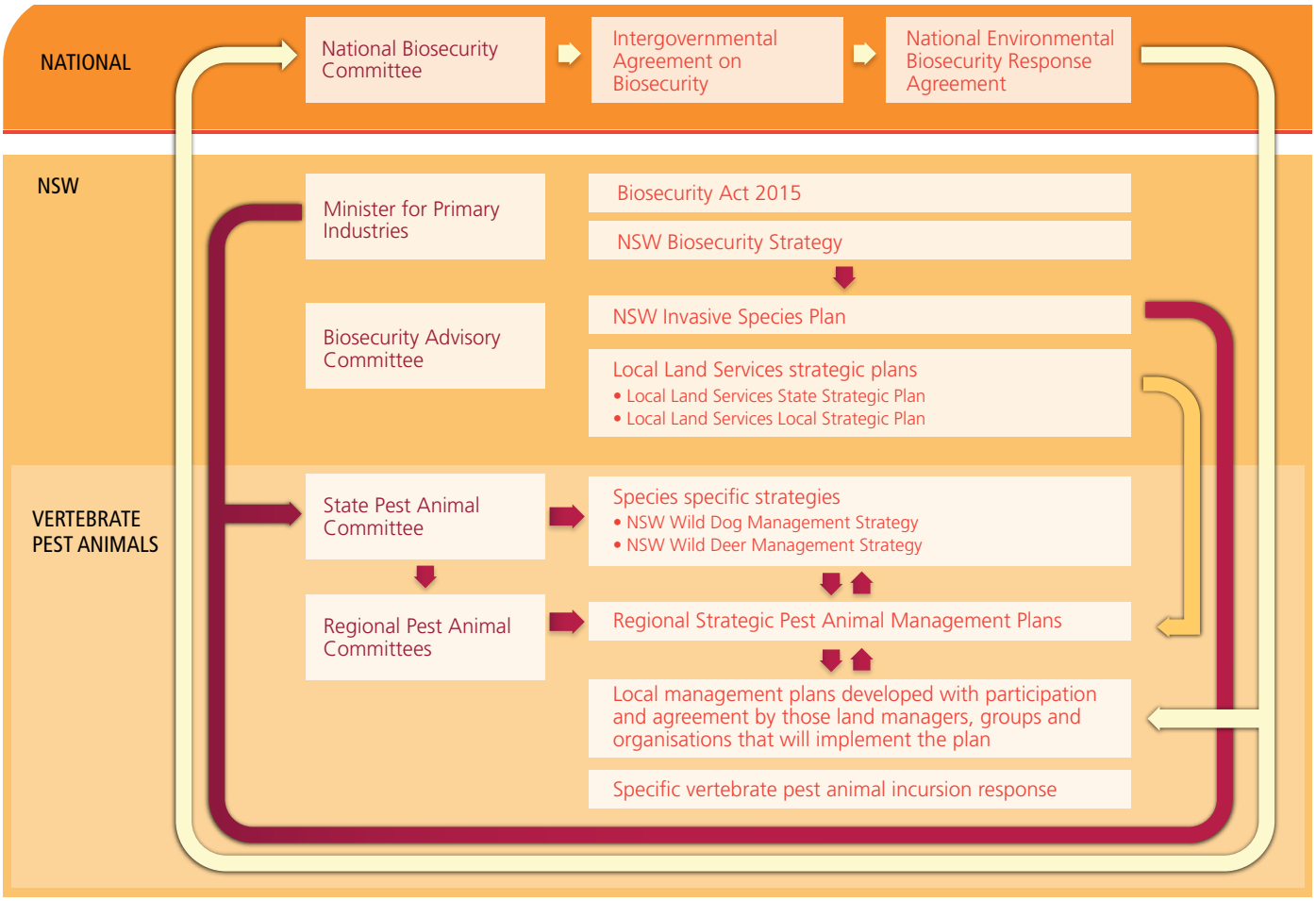


Figure 1: Framework for managing vertebrate pests in NSW

1.6 Roles and responsibilities

- Under the new Biosecurity Act 2015 framework, biosecurity is a shared responsibility where Government, industry and the people of NSW work together to protect the economy, environment and community from the impacts of pest animals.
- Public, private and aboriginal land managers all have a shared and equal responsibility to eliminate and minimise biosecurity risks across land in NSW.
- A key focus of this plan is to encourage engagement and participation across all land tenures to enhance the participation and delivery of coordinated pest animal management activities for improved outcomes.
- Government plays a key role in coordination and regulation for pest animal management under the legislative framework. NSW DPI have a lead role in managing terrestrial and freshwater aquatic pest incursions. Local Land Services supports the delivery of pest animal management activities and also have a regulatory role under the *NSW Biosecurity Act 2015*.

The following outlines the roles of the Regional and State Pest Animal Committees in the delivery of this plan. For more information on key roles and responsibilities in pest animal management, please refer to the Invasive Species Plan 2018-2021.

State Pest Animal Committee

The State Pest Animal Committee (SPAC) is responsible for overseeing a consistent approach to the ongoing operation of RPACs and development of tenure neutral RSPAMP across the State. SPAC oversee key policy and strategy documents to guide pest animal management outcomes across the State.

Regional Pest Animal Committees

Regional Pest Animal Committees (RPACs) facilitate tenure neutral strategic planning and coordination for priority pest animal management programs in each Local Land Services (LLS) region. RPACs have an important role to play in the delivery of this plan through promoting land manager and general community involvement in detecting and reporting sightings of new or 'unusual' animals in the local area as well as managing established pest animals. RPACs play an important role in the ongoing periodic review and adaption of the plan as required.

Barbary dove (Credit: Hans & Jens Erickson 2010)

Oriental Weather Loach (Credit: QLD Department of Agriculture and Fisheries)

Mozambique Tilapia (Credit: QLD Department of Agriculture and Fisheries)

1.7 Incursion management and alert species

We need to work together to ensure early detection and awareness of incursions and alert species are able to be managed swiftly and effectively. It is important the community remain vigilant and report any unusual sightings to ensure a rapid management response. The most cost-effective control by far, is preventing incursions in the first place and dealing with them swiftly and effectively when they do occur.

The *NSW Biosecurity Act 2015* outlines species that are prohibited from being kept in NSW.

For species that are yet to become widely established in NSW, the initial response to incursion reports is managed through consultation between DPI, LLS and OEH. Where species are widely established in NSW but have spread into a new region, Local Land Services and the RPAC will consider whether local eradication or containment should be attempted.

Land managers and community members play a major role in reporting any unusual sightings of pest animals in the region. If you see anything unusual or suspicious, report it as soon as possible.

The alert species for the Hunter region and the number to contact follow. Alert species are not known to be present in the region and represent a significant threat. Our aim is to prevent these species from arriving and establishing in the Hunter.

For any of the species below, contact the Invasive Plants and Animals Enquiry Line:

Phone: 1800 680 244
Email: invasive.species@dpi.nsw.gov.au

Cane toad (Credit: Deborah Metters 2016)

Red-eared slider turtle (Credit: NSW DPI 2016)

Indian Ring-necked Parrot (Credit: Cyril Laubscher 2007)

Land and Air Pests:

- Chital Deer (*Axis axis*)
- Hog Deer (*Axis porcinus*)
- Indian Ringnecked Parrot (*Psittacula krameri*)
- Barbary Dove (*Streptopelia roseogrisea*)
- Common Pheasant (*Phasianus colchicus*)
- European Greenfinch (*Carduelis carduelis*)
- Ostrich (*Struthio camelus*)
- Song thrush (*Turdus philomelos*)
- Tree Sparrow (*Passer montanus*)

Aquatic Pests:

- Cane toad (*Bufo marinus*)
- Red Eared Slider Turtle (*Trachemys scripta elegans*)
- Banded Grunter (*Amniataba percoides*)
- Green Swordtail (*Xiphophorus helleri*)
- Guppy (*Poecilia reticulata*)
- Jack Dempsey cichlids (*Cichlasoma octofasciatum*)
- Mozambique Tilapia (*Oreochromis mossambicus*)
- Oriental Weather loach (*Misgurnus anquillicaudatus*)
- Pearl Cichlid (*Geophagus braziliensis*)
- Redfin Perch (*Perca fluviatalis*)
- Tench (*Tinca tinca*)
- White Cloud Mountain minnows (*Tanichthys albonubes*)

2. Guiding principles of pest animal management

The following principles should be considered and implemented by all community, industry, landholders and other stakeholders in pest animal management.

Be alert

Monitor and report sightings of any species you have not seen in your area before. Community support greatly assists prevention and early intervention, avoiding the establishment of new pest animal species.

Work together and participate

Pest animal management is a shared responsibility between landholders, community, industry and Government and requires a coordinated approach across a range of scales and land tenures.

Be committed

Effective pest animal management requires ongoing commitment by land managers, community, Government and industry. Those that create the risks associated with pest species and those that benefit from the pest animal management outcomes should help to minimise impacts and contribute to the costs associated with management.

Stay up-to-date

Community, industry, government and landholders should stay up-to-date with new information to ensure that contemporary best practice pest animal management activities are employed to reduce pest animal impacts in a way that is as safe, effective, target-specific and humane.

3. Our region

The Hunter region (Figure 2) covers an area of 33,000 square kilometres east of the Great Dividing Range, from the dramatic sandstone escarpments and gorges of the Goulburn River, to the rich alluvial floodplains of the Hunter and Williams Rivers. Along the coast, the region extends from Lake Macquarie in the south, to Crowdy Bay in the north.

A diverse mix of vegetation and natural features support some 320 threatened species in the region. There are around 670,000 people living in the region with most people living within 40 km of the coast. There are 15 Local Aboriginal Land Councils in the region which continue to manage important cultural sites and landscapes.

The natural resources of the Hunter region have enabled the development of a wide range of industries, including tourism, agriculture, aquaculture and fisheries, coal mining, power generation, and recreation. The region is also internationally known for its thoroughbred horse industry and vineyards.

Grazing, nature conservation and production native forestry are the dominant land uses (Figure 3) and make up over 85% of the region with residential and commercial development dominating the coastal fringe. This mosaic harbours a range of pest animals and makes a tenure neutral and co-ordinated approach essential for effective pest management. The region also borders six other LLS regions, making cross regional collaboration essential for effective management at regional boundaries.

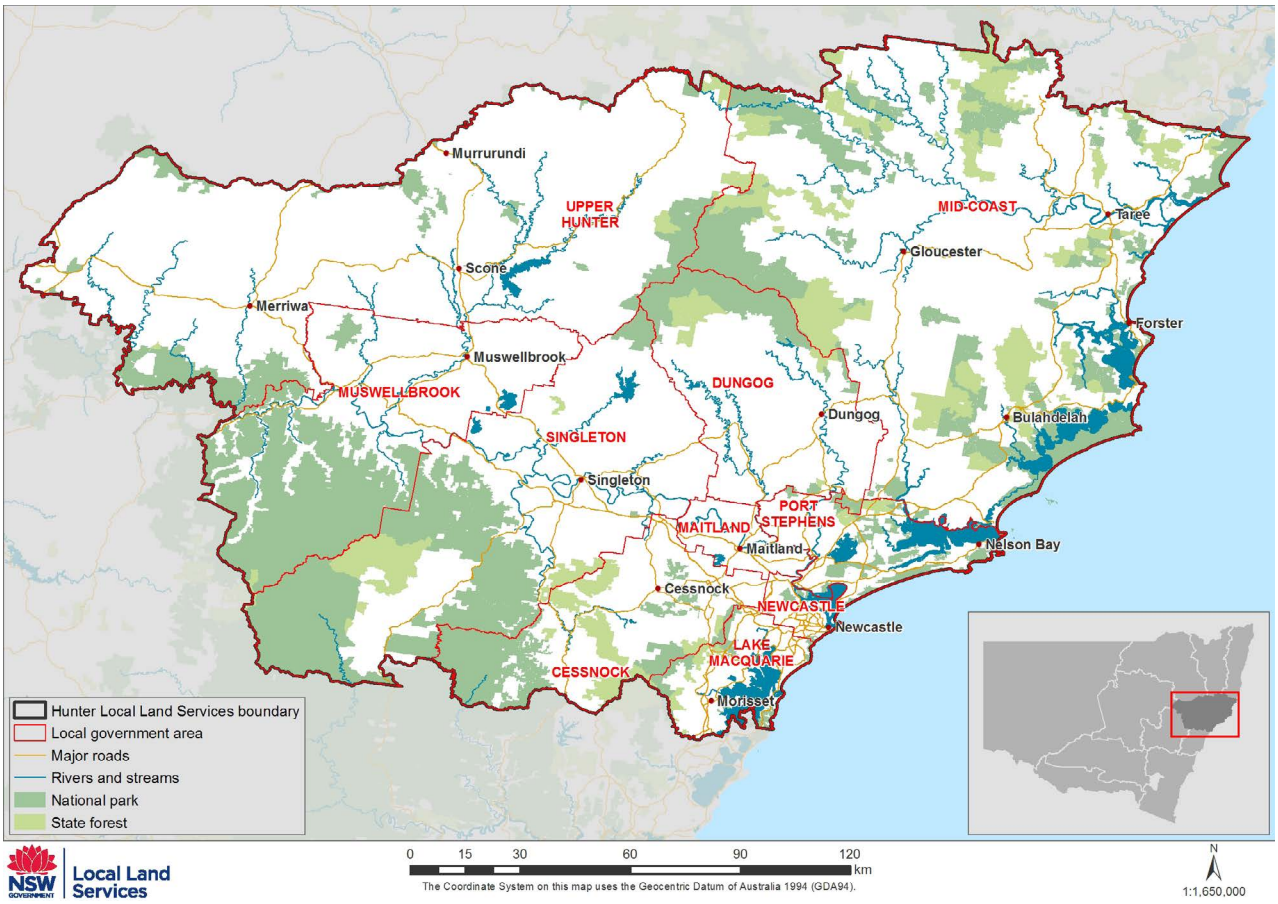


Figure 2: The Hunter region showing local government areas

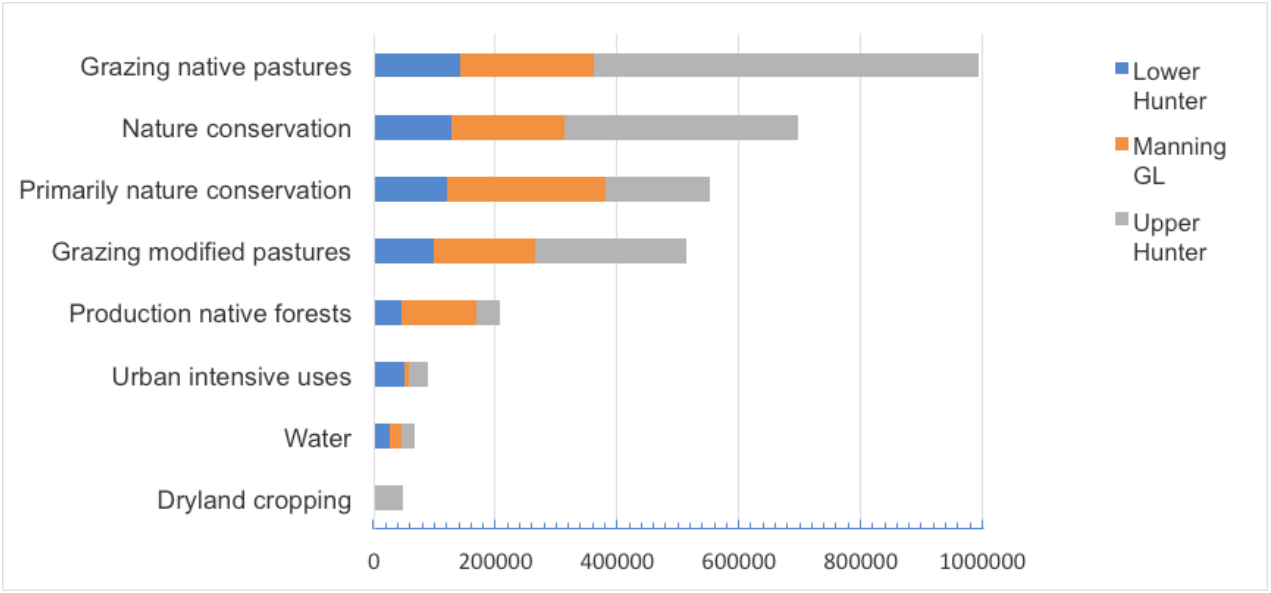


Figure 3: Main land uses (hectares) in the Hunter region by district. "Primarily nature conservation" refers to land managed for minimal other use and is in a largely natural state.

The majority of dryland cropping (Figure 3) and sheep grazing is in the Upper Hunter district. Wild dogs and foxes impact on sheep production, and feral pigs and wild deer can cause major damage to crops. Within grazing country across the region, rabbits persist in varying concentrations.

Foxes and cats have a big impact on our native fauna and large hoofed animals like wild deer and horse have significant impacts on sensitive environments. Other impacts include mental health, direct harm from contact, and quality of life. For example, wild dog and fox attacks on livestock and pets, lethal or otherwise, cause emotional distress to landholders and threaten human health, safety and wellbeing. Deer and wild horses are becoming a significant risk to human safety, with several road fatalities in recent years.

The distribution of some pest animals in the region (e.g. deer) has increased and along with increasing urbanisation (especially in the Lower Hunter) this means more communities are affected by pest animals and pest control becomes more complex. Control in peri urban and urban environments is complex because control options are more limited, peoples livelihoods aren't dependent on the land and a greater range of issues have to be considered.

4. Managing our pest animals

The following table details the management categories that will be used to minimise and mitigate the impact pest animals have on the community, environment and economy. Management of pest animals in the Hunter region relate to this framework and priority species have been allocated to one of the following management categories, based on the results of the assessment. Management categories for species may change over time.

Table 4.1 Framework for managing pest animals

Management Category	Overview
Prevention/Alert	• **GOAL:** To prevent the pest animal species arriving and establishing in the Region causing adverse impacts on the environment, society and the economy. • **RESPONSIBILITY:** To understand and report any sightings of alert species (listed in section 1.7 of this plan).
Eradication	• **GOAL:** To permanently remove the species from the State or Region and to develop actions to prevent its re-establishment. • **RESPONSIBILITY:** To participate in coordinated programs and stay up-to-date with current information on pest animals in the region.
Containment	• **GOAL:** To prevent the spread of the pest animal species onto other parts of the State or Region. • **RESPONSIBILITY:** To participate in coordinated programs, stay up-to-date and apply best practice pest animal management practices.
Asset Based Protection	• **GOAL:** To reduce the impact of widespread pest animals on key assets with high economic, environmental and social value. • **RESPONSIBILITY:** To participate in coordinated programs, stay up-to-date and apply best practice pest animal management practices. Ensure practices are coordinated with neighbours.
Limited Action	• **GOAL:** Applies only to species that have a low to negligible risk in the region or for which further investigation is required on effective control techniques and strategies for management. • **RESPONSIBILITY:** Stay up-to-date with current information.

5. Our pest animal programs

Pest animals for the Hunter region have been prioritised based on the level of risk and feasibility of control. An initial assessment of 64 potential species was undertaken using the approach outlined in the prioritisation guidelines for NSW (Appendix 1: Prioritisation Guidelines). Of the 64 species considered, 13 species were identified as potential plan priorities and 11 as Alert species.

A more detailed assessment was undertaken for potential plan priority species by working groups of the Hunter Regional Pest Animal Committee using the South Australian (SA) Pest Animal Risk Management System, which was developed by the Animal and Plant Control Group 2007. Resulting priorities and programs based on this prioritisation work follow, with a summary of priorities covered in this section listed in Table 5.1 below. These reflect the key priorities for each species, not all possible impacts. For example, wild dog and feral pig can be a threat to human safety, but their main impact and therefore the key priority for reducing impact, is on primary production.

Matters relating to public safety are taken seriously by Local Land Services, local councils and public land managers, and responded too promptly. Reporting of such incidents and near misses is essential information in managing risks to human safety. For example, wild deer and wild horse pose a significant potential risk on public roads as the consequence of any accident is likely to be high due to their size. Anecdotal information suggests the risk of an accident occurring is high, but this is not reflected in some motor transport statistics and more information including near misses is needed. RPAC will continue to seek reliable information to help manage and assess risks.

The community are strongly encouraged to report all incidents involving human safety and near misses to their local biosecurity ranger or local council. A near miss is where no one is harmed, but could easily have been, such as a close call with a wild deer or wild horse on a road. Incidents involving motor vehicle accidents should be reported to police. Each listing in this section includes the management category, program/focus area, assets to protect and other details for that species. RPAC will work with DPI and the State Pest Animal Committee on the importance of raising the level of community awareness concerning the illegal release of feral animals within the region and engaging community assistance in reducing the impact of such activity.

Pest management is most effective when it employs an integrated program of different tools and techniques. In this plan:

- primary pest animal control refers to the main control activity, such as aerial or ground baiting for wild dogs
- supplementary control refers to control activities undertaken in conjunction with primary control to increase overall effectiveness, such as shooting or trapping of wild dogs.
- complementary strategies refer to non-lethal strategies that deter or prevent impact, rather than controlling the pest.

The pest animal distribution maps in this plan are based on state-wide data compiled in 2016 from reports submitted and gathered. The maps are at a coarse scale and provide general guidance only on pest animal distribution. A key priority for future implementation of this plan will be to improve reporting of pest animals to help refine regional information on pest animal distribution and relative abundance. This will help guide management, investment and assessment of effectiveness.

Table 5.1: Species listed in this section

Common Name	Management Category	Section in Plan	Objective (area of focus)
Public Safety			
deer, Sambar	Containment	5.7	SD2 - Reduce negative impacts of Sambar deer on road safety, horticulture, viticulture and biodiversity within the Containment zones (Cessnock and Coopernook areas)
deer, Rusa	Asset Based Protection	5.8	RuD2 - Reduce negative impacts of Rusa deer on road safety, grazing land and biodiversity in the mapped area (Coomba park area)
deer, Fallow	Asset Based Protection	5.9	FD1 - Reduce negative impacts of Fallow deer on public safety, grazing and cropping land (Peri Urban areas)
deer, Red	Asset Based Protection	5.10	RD1 - Reduce negative impacts of Red deer on public safety, grazing and cropping land (Peri Urban areas)
Wild horse	Asset Based Protection	5.11	WH1 - Reduce negative impacts of Wild horse on public safety, biodiversity and grazing land (Nerong area and Scone-Gloucester Road)
Primary production			
Wild dog	Asset Based Protection	5.1	WD1 - Reduce the negative impacts of wild dogs on stock and landholders, utilising best practice (whole region).
European red fox	Asset Based Protection	5.2	F1 - Reduce the negative impacts of foxes on stock, utilising best practice (Sheep in the Upper Hunter and Poultry in the Lower Hunter)
Feral pig	Asset Based Protection	5.3	FP1 - Reduce the negative impacts of feral pigs on agriculture and biodiversity (Cropping & Grazing in the Upper Hunter)
Wild rabbit	Asset Based Protection	5.4	R1 - Reduce the negative impacts of rabbits on grazing land and biodiversity through a co-ordinated program to substantially reduce rabbit numbers in the long term
deer, Sambar	Containment	5.7	SD2 - Reduce negative impacts of Sambar deer on road safety, horticulture, viticulture and biodiversity within the Containment zones (Cessnock and Coopernook areas)
deer, Rusa	Asset Based Protection	5.8	RuD2 - Reduce negative impacts of Rusa deer on road safety, grazing land and biodiversity in the mapped area (Coomba park area)
deer, Fallow	Asset Based Protection	5.9	FD1 - Reduce negative impacts of Fallow deer on public safety, grazing and cropping land (Upper & Lower Hunter)
deer, Red	Asset Based Protection	5.10	RD1 - Reduce negative impacts of Red deer on public safety, grazing and cropping land (Upper Hunter)

Common Name	Management Category	Section in Plan	Objective (area of focus)
Feral birds	Asset Based Protection	5.12	B1 - Reduce the negative impacts of feral birds on high value agriculture and biodiversity (Region)
Biodiversity			
Wild rabbit	Asset Based Protection	5.4	R1 - Reduce the negative impacts of rabbits on grazing land and biodiversity through a co-ordinated program to substantially reduce rabbit numbers in the long term
European red fox	Asset Based Protection	5.2	"F3 Long term programs to reduce fox numbers below critical thresholds to reduce impacts on biodiversity and protect threatened species (focus in interim is supporting Saving our Species program priority sites and actions and control in Peri urban areas)
Feral cat	Asset Based Protection	5.5	C1 - Reduce the negative impacts of feral cats on threatened species (breeding sites)
Feral pig	Asset Based Protection	5.3	FP1 - Reduce the negative impacts of feral pigs on agriculture and biodiversity (threatened species various sites)
Feral goat	Asset Based Protection	5.6	FG1 - Reduce the negative impacts of feral goats on biodiversity (various sites)
deer, Sambar	Containment	5.7	SD2 - Reduce negative impacts of Sambar deer on road safety, horticulture, viticulture and biodiversity within the Containment zones (Cessnock and Coopernook areas)
deer, Rusa	Asset Based Protection	5.8	RuD2 - Reduce negative impacts of Rusa deer on road safety, grazing land and biodiversity in the mapped area (Coomba park area)
Wild horse	Asset Based Protection	5.11	WH1 - Reduce negative impacts of Wild horse on public safety, biodiversity and grazing land (Barrington tops)
"Peafowl	Containment	5.12	B4 – Monitor and review emerging species for possible co-ordinated control or response (Coastal areas)
Guineafowl"	Containment	5.12	B4 – Monitor and review emerging species for possible co-ordinated control or response (Coastal areas)
Common carp	State-wide program	5.13	C1 – Support any state-wide control program and associated monitoring (State-wide control)
Platy fish	Containment	5.13	C2 - Respond quiickly to any new incursions to reduce negative impacts on freshwater ecosystems (Lower Hunter)

5.1 Species – Wild Dog

Impacts and distribution

Wild dogs effectively occupy the entire region (Figure 4) and all non-urban land uses. Wild dogs kill and injure domestic stock and pets which can have significant financial and emotional impacts on landholders. Unlike foxes and cats, wild dogs are not listed as a key threat to a wide range of native species.

Management

The term wild dog, refers to all wild-living dogs: dingoes, feral domestic dogs and the hybrid descendants of these (all of which are currently considered to be Canis familiaris). The primary focus of wild dog management is reducing the negative impacts of wild dogs on commercial livestock (cattle and sheep) and hobby farms (cattle, sheep and other small ruminants) across the region. In doing so, finding a balance between managing wild dogs in areas where they have negative impacts and conserving dingoes is important. Strategy 1.2.2 Conservation of dingoes in the NSW Wild Dog Management Strategy 2017-2021, requires that RSPAMPs and Wild Dog Management Plans focus control on areas where the risk of negative impacts is greatest.

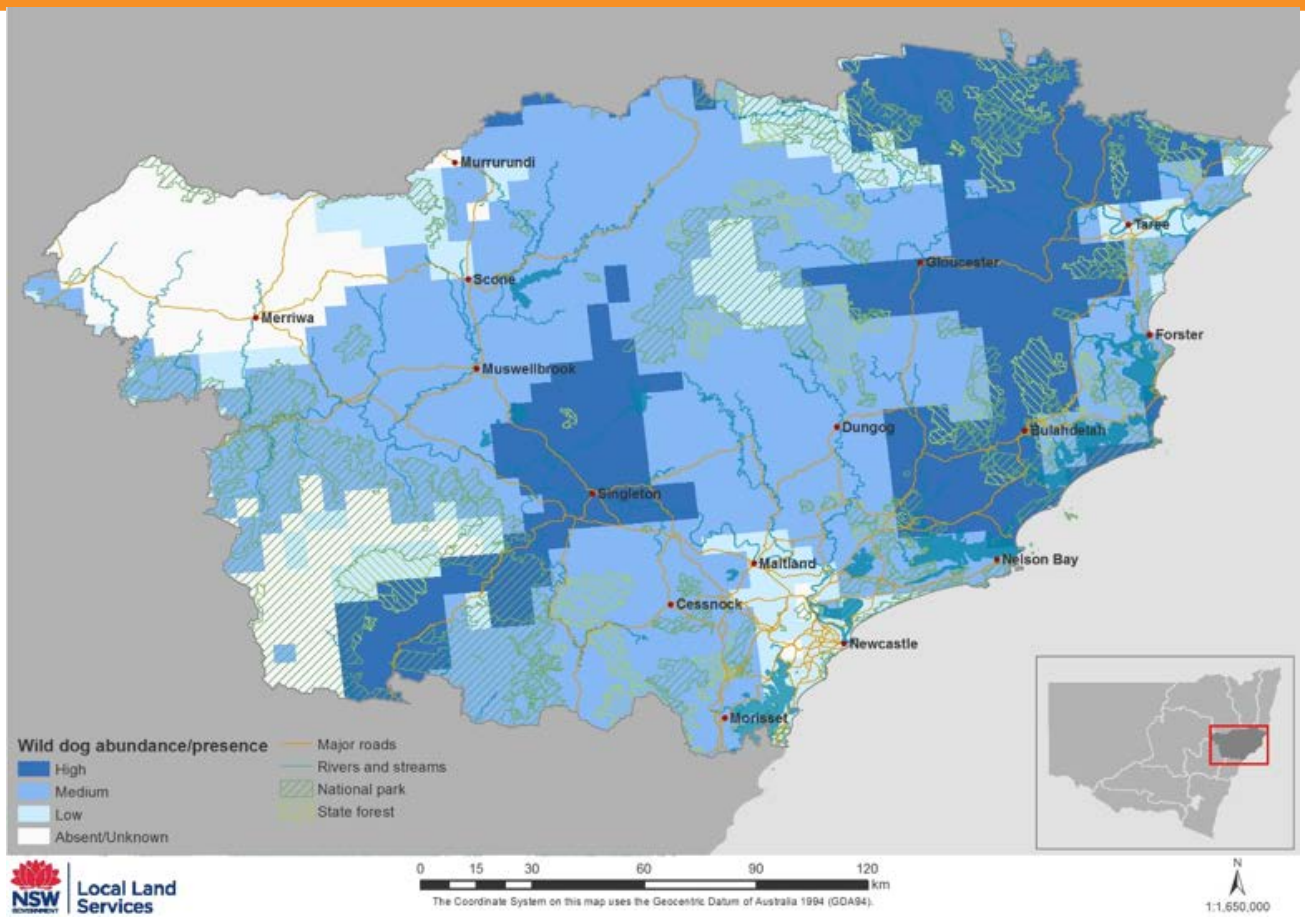


Figure 4: Map of wild dog distribution

Distribution data sourced from NSW Government agencies and collated by the NSW Department of Primary Industries in 2016.

Effective wild dog management requires a strategic and proactive approach where private and public land managers use a cross-tenure planning process. Control strategies and techniques for wild dogs are well established. Nine wild dog management plan areas (Figure 5) have been developed in accordance with the NSW Wild Dog Management Strategy which specify what control and monitoring work will be done and where, who is responsible for conducting and/or paying for that work, and timelines for achievement.

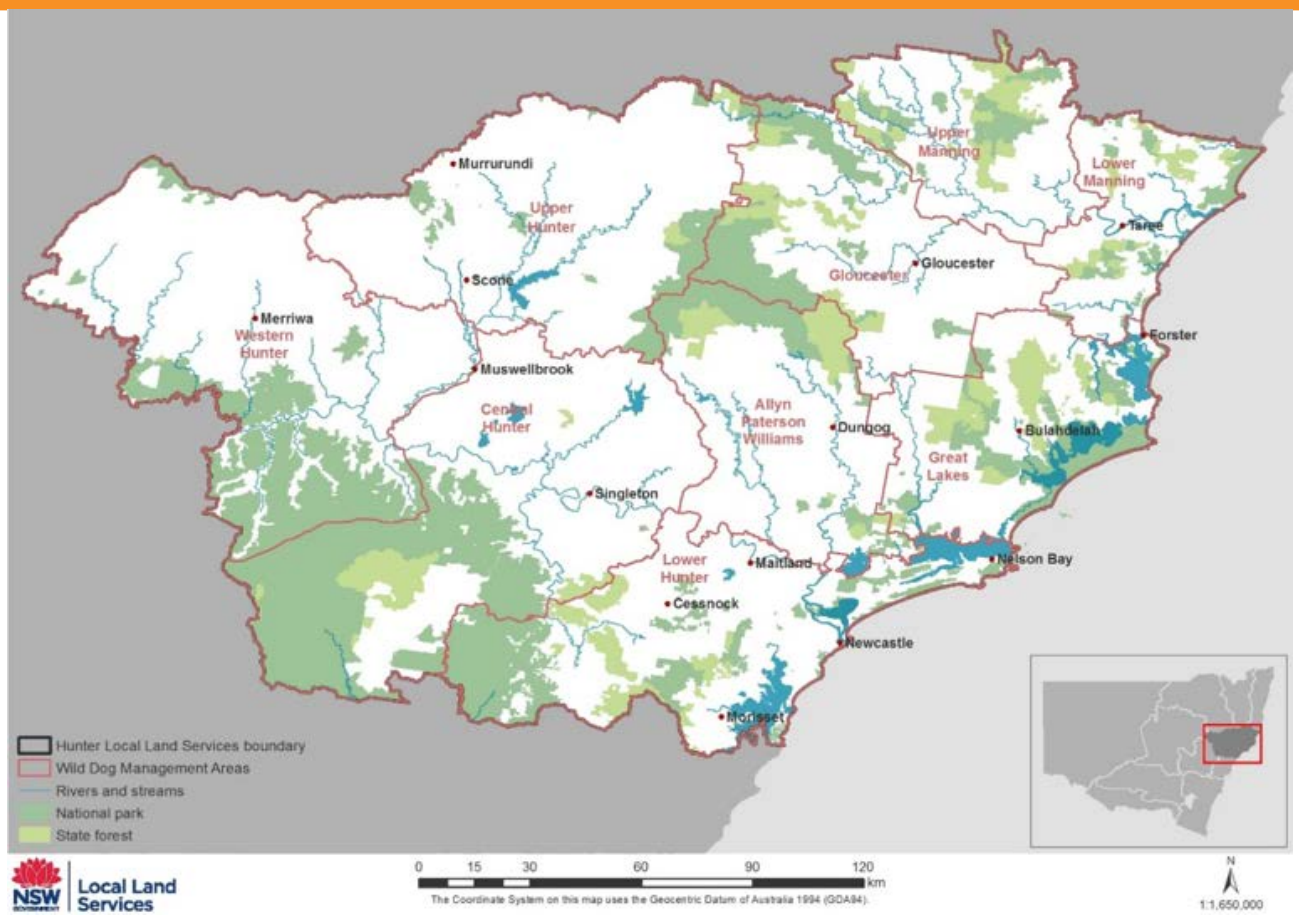


Figure 5: Map of wild dog management plan areas

All landholders who experience attacks on stock and domestic animals or who sight wild dogs on their land are expected to participate in strategic planned control activities outlined in the wild dog management plan. In instances where responsive control activities are required, participation will be determined by the extent to which the problem can be controlled. Landholders are increasingly making use of motion sensor cameras to identify the presence of wild dogs on their property and through that intelligence develop effective wild dog control strategies such as baiting, shooting or trapping.

Expectations of land managers

All land managers can reduce risks from wild dog populations on land under their care and control, by undertaking activities that:

- reduce the risk of wild dogs breeding on or being introduced to their land
- reduce the risk of wild dogs being released into the environment
- reduce the risk of wild dogs accessing easy food sources on their land
- reduce the negative impacts of wild dogs on priority assets on their land and neighbouring lands.

Examples of activities a landholder could undertake to achieve these outcomes are:

- participating in coordinated pest animal control programs
- undertaking activities that incorporate both primary and supplementary pest animal control
- reporting any wild dog activity to neighbours and their local biosecurity ranger (and/or Wilddog scan)
- ensuring potential food sources such as carcasses, offal and food scraps are properly disposed of
- ensuring pet and working dogs remain on their property and euthanising unwanted animals.

Wild dog Strategic Objectives

WD1 - Reduce the negative impacts of wild dogs on stock and landholders, utilising best practice.

WD2 - Ensure all areas of the region are covered by best practice wild dog management plans and serviced by effective cross tenure co-ordination.

WD3 - Support landholders to undertake co-ordinated control, ensuring landholders are accredited to use 1080 and provide training on effective control methods.

WD4 – Support dingo conservation and management in identified conservation reserves.

Program name/area	Management category Assets	Activities / Timeframe	Key stakeholders
Wild dog Reduce negative impacts on stock and landholders.			
5.1a Gloucester Wild Dog Plan Management (WDMP) Area Great Lakes WDMP Lower Manning WDMP Upper Manning WDMP Lower Hunter WDMP including Allyn Paterson Williams WDMP Area	Asset based protection - Commercial livestock (beef) and hobby farms (beef and small ruminants) (WD1, WD3)	Aerial baiting (to be considered in Greats Lakes and Lower Manning) Strategic - Autumn Ground baiting Strategic - Autumn & Spring Ground baiting, trapping and shooting. Responsive all year	HLLS, NPWS (Gloucester only), Forestry Corp, WDCG Landholders – WDCG, HLLS, NPWS, Forestry Corp and where relevant mining companies, Allyn Paterson Williams, Mid Coast Council & Hunter water
5.1b Western Hunter (Goulburn River and Wybong WDAs) Upper Hunter (Murrurundi, Barnard River, Ellerston, Mt Hungerford, Scone and Rouchel WDAs) Central Hunter (Hebden, Singleton North East and Mt Arthur WDAs)	Asset based protection Commercial livestock – sheep, cattle and goats (WD1, WD3)	Aerial baiting Ground baiting strategic Autumn – Spring and as required Responsive - all year Professional Wild Dog Control Program PWDC. Responsive - all year	Landholders – Wild Dog Control Group (WDCG), NPWS, Forestry Corp and other identified key stakeholders
5.1c Monitoring for the above programs	WDMP implementation (WD3)	Monitoring effectiveness of WDMP programs in accordance with the plans (combination of cameras and Wilddog scan recording of control and sightings)	WDCG, LLS
5.1d Increased and improved reporting of stock losses and sightings to neighbours and Wilddog scan in all wild dog plan areas	Improved information flow and reporting to guide activities. Develop and embed Wilddog scan in WDMP areas (WD2)	Community training events – Wilddog scan Program reporting back to participating landholders and stakeholders. Ongoing	LLS, NPWS, Forestry Corporation, landholders, WDCG
5.1e Establish wild dog plans as the basis for more strategic and co-ordinated control in all wild dog plan areas	Co-ordination of asset based protection Improve community ownership and participation in the plans (WD2, WD3)	Ongoing	LLS, NPWS, Forestry Corporation, landholders WDCG
5.1f Establish new wild dog control groups in Western Hunter, Goulburn River and Wybong WDA areas	Improve community participation in key areas for asset based protection (WD2, WD3)	Community communications August 2018	LLS, NPWS, Forestry Corporation, landholders WDCG

5.1g Complementary strategies for reducing the negative impacts of wild dogs on stock (deterrents, stock Guardian animals, exclusion fencing etc)	Improve awareness and uptake of best practice complementary strategies in problem areas (WD1+WD4)	Field days case studies Ongoing	LLS, landholders, WDCG, research and funding organisations
5.1h Ensure land managers understand their obligations under the Biosecurity Act for wild dogs	Supporting requirements of the GBD and the Biosecurity Act for Asset based protection Commercial livestock (cattle and sheep) and hobby farms (cattle, sheep and other small ruminants) (WD1)	Community communications Compliance and inspection activities Ongoing	LLS, all landholders public and private
5.1i Identify gaps in wild dog control and engage with key holdings to improve involvement	Supporting requirements of the GBD and the Biosecurity Act for Asset based protection Commercial livestock (cattle and sheep) and hobby farms (cattle, sheep and other small ruminants) (WD1)	Community communications Compliance and inspection activities Ongoing	LLS, all landholders public and private
5.1j Support conservation management and maintenance of the genetic integrity of dingoes in identified conservation reserves	Asset protection (dingo conservation) WD4	Identification of areas important for dingo conservation based on best available science and genetic testing Co-ordination of wild dog management activities. Collaboration and data sharing	NPWS and other public land managers. LLS, WDCGs and research organisations
5.1k Review processes to comply with 1080 PCO for landholders	WD1+WD3	Review, looking for opportunities to streamline processes for landholders in implementing and notifying neighbours	LLS, all landholders public and private

Wild dog (Credit: QLD government)

5.2 Species – European Red Fox

Impacts and Distribution

Foxes are nationally listed as a key threatening process and are a major threat to our wildlife, smaller livestock, small domestic pets and can spread several serious diseases (including hydatids) and weeds. They also affect the dairy and beef industries through the spread of a disease (Neospora caninum) that leads to abortions in cattle. Fox dens are common in riverbanks and along watercourses and foxes extend well into urban areas, particularly at night.

Foxes effectively occupy the entire region. Reduction in fox numbers across a large part of the region is a secondary benefit of wild dog baiting activities that benefits our natural environment and sheep producers.

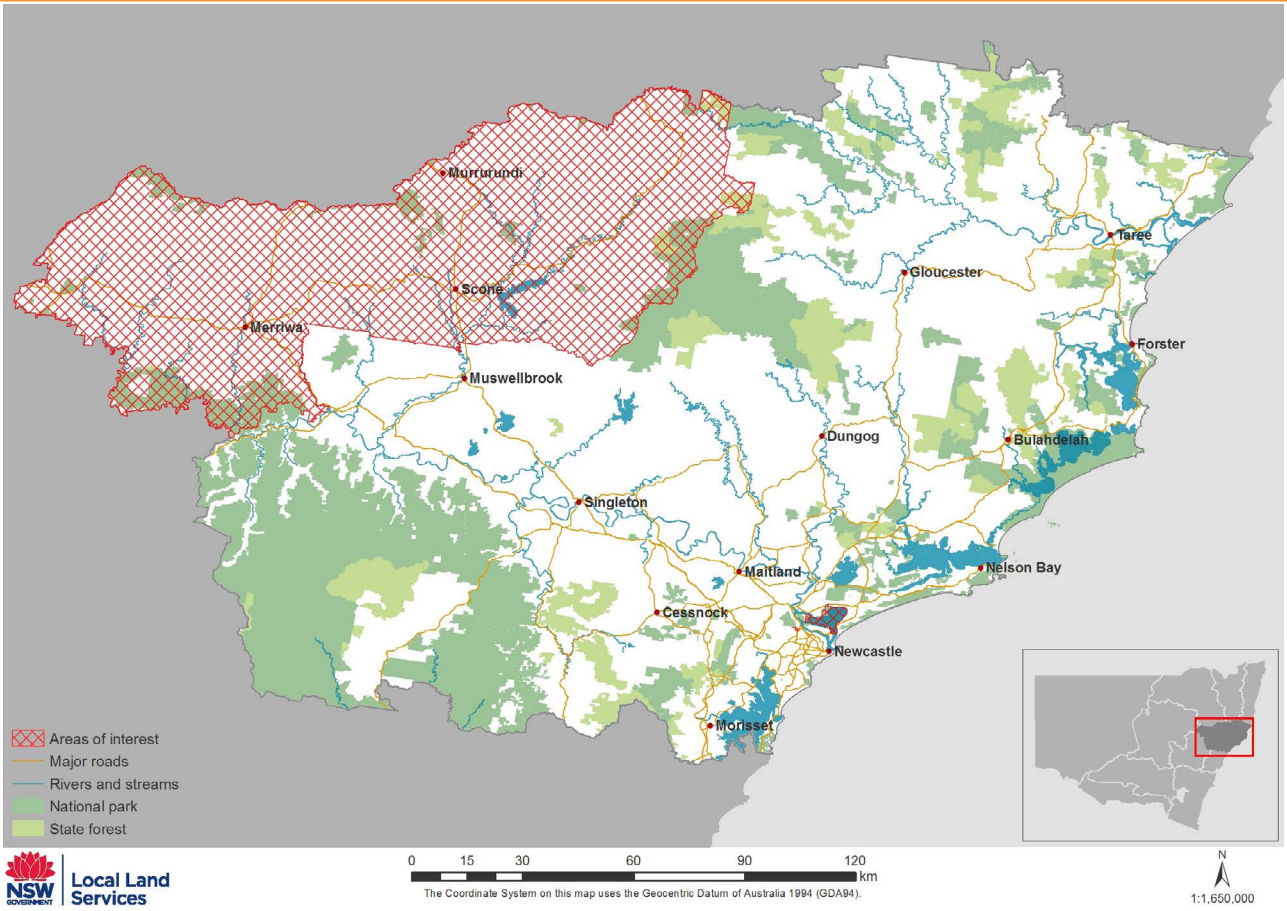


Figure 6: Map of the region showing some management priority areas for red fox

Management

The primary focus for management is reducing the impact of foxes on sheep (commercial meat and wool) and biodiversity (threatened species). Most commercial sheep farming is in the Upper Hunter local government area and the Hunter estuary Ramsar site is an important area for shorebirds. While both are shown in Figure 6, there are numerous other shorebird sites along the coast and Saving our species program priority sites in the Hunter important for protecting threatened species that aren't shown.

Control strategies and techniques for foxes are relatively well established but the capacity of foxes to disperse and recolonise creates some challenges. Long term landscape scale programs are needed to reduce fox numbers below critical thresholds to protect threatened species more effectively. There is also mounting evidence that native animals are highly vulnerable to fox and cat predation in recently burnt habitats. Feral predator control to protect threatened species after fire will be considered.

Expectations of land managers

All land managers can reduce risks from European Red Fox populations on land under their care and control, by undertaking activities that:

- reduce the risk of foxes breeding on or being introduced to their land
- reduce the risk of foxes accessing easy food sources on their land
- reduce the negative impacts of foxes on priority assets on their land and neighbouring lands.

Examples of activities a landholder could undertake to achieve to these outcomes are:

- participating in coordinated pest animal control programs
- undertaking activities that incorporate both primary and supplementary pest animal control
- reporting any fox activity or dens to neighbours and their local biosecurity ranger
- ensuring potential food sources such as carcasses, offal and food scraps are properly disposed of.

Fox Strategic objectives

F1 - Reduce the negative impacts of foxes on stock, utilising best practice.

F2 - Support landholders to undertake co-ordinated control, ensuring landholders are accredited to use 1080 and provide training on effective control.

F3 - Develop and resource long term programs to reduce fox numbers below critical thresholds to reduce impacts on biodiversity and threatened species. In the interim, effective cross tenure control will focus on Saving our Species (SoS) program priority sites and actions and peri urban areas.

Program name/area	Management category Assets (where relevant)	Activities / Timeframe	Key stakeholders
Fox Reduce negative impacts on stock and conserve biodiversity			
5.2a Upper Hunter	Asset based protection – sheep, commercial wool and meat (F1, F2)	Ground baiting and Trapping. Strategic - Autumn, Spring Trapping and shooting Responsive - all year	LLS, NPWS, local landholders
5.2b Lower Hunter	Asset based protection - poultry (F1, F2)	Aerial baiting. Strategic - Autumn, Spring Ground baiting, trapping and shooting. Responsive - all year	LLS, local wild dog groups
5.2c Protect threatened species (per Saving our Species program priorities)	Asset based protection - shorebirds - Long nosed potaroo (Potorous tridactylus) - Broad toothed rat - Brush Tail Rock wallaby (F3)	Ground baiting and trapping (where appropriate). Strategic – autumn (and spring for some) Responsive – fumigation/ destruction of any fox dens identified	NPWS, LLS, coastal councils, landholders
5.2d Fox breeding sites adjoining urban-peri urban areas within 10km of the coast	Asset based protection - urban communities (F3)	Trapping, den fumigation, targeted ground shooting. Strategic – May (before breeding in June-July) Improve reporting of fox dens by the community	LLS, councils, public authorities, landholders All landholders and interested community members
5.2e Monitoring for the above programs	Program (F1-F3) implementation	Monitoring effectiveness of programs. Cameras	WDCG, LLS, NPWS, local councils

Program name/area	Management category Assets (where relevant)	Activities / Timeframe	Key stakeholders
5.2f Ensure land managers understand their obligations under the Biosecurity Act to control foxes	Asset based protection - commercial stock and threatened species (F1 to F3)	Community communications Ongoing	LLS, all landholders public and private
5.2g Increase awareness of impacts on dairy and beef cows and strategies to mitigate (F1)	Asset based protection - Dairy cows (disease risks), fumigation of fox dens in riverbanks etc	Community communications	Dairy farmers
5.2h Link fox control activities with wild dog management groups	Improve community participation in key areas for asset based protection (F1 to F3)	Community communications August 2018	LLS, landholders, WDCGs
5.2i Complementary strategies to reduce the negative impacts of foxes on: - stock and poultry (for example deterrents, stock Guardian animals, exclusion fencing). - threatened species (for example deterrents, exclusion fencing)	Improve awareness and uptake of best practice complementary strategies by commercial sheep and poultry farms in the region (F1)	Field days and case studies Ongoing	LLS, landholders, WDCGs, industry, research and funding organisations
	Support development and use in threatened species protection in the region. (F3)	Field trials and research Ongoing	LLS, OEH, local councils, universities and research and funding organisations

5.3 Species – Feral Pig

Impacts and Distribution

Feral pigs are significant environmental and agricultural pests. They cause damage through wallowing, rooting for food and selective feeding, destroying crops and pasture, and habitat for native plants and animals. Significant soil disturbance, alters drainage, increases turbidity and sedimentation and greatly assists the spread of weeds. Pigs carry disease and parasites that affect stock and pose a disease risk to humans (brucellosis) and are a major potential host of exotic diseases such as foot-and-mouth. They also prey on young lambs and many native animals including frogs, reptiles, birds and small mammals.

Feral pigs occupy most of the region and most land uses (Figure 7: Map showing the distribution and density of Feral pigs in the region7), but their numbers fluctuate seasonally, and their distribution is limited somewhat by soil types, local resources and past and continuing control efforts. During dry periods pigs congregate around food and water sources, providing good opportunities to control their numbers.

Management

The primary focus of feral pig management in the region is more proactive and co-ordinated control of feral pig numbers and addressing impacts before they have become problematic. For programs related to grazing and cropping LLS will co-ordinate, supply baiting products and use of traps. All affected and adjoining landholders may be expected to participate fully in coordinated programs in their area. Affected landholders will be required to provide feed for baiting and manage traps on their properties.

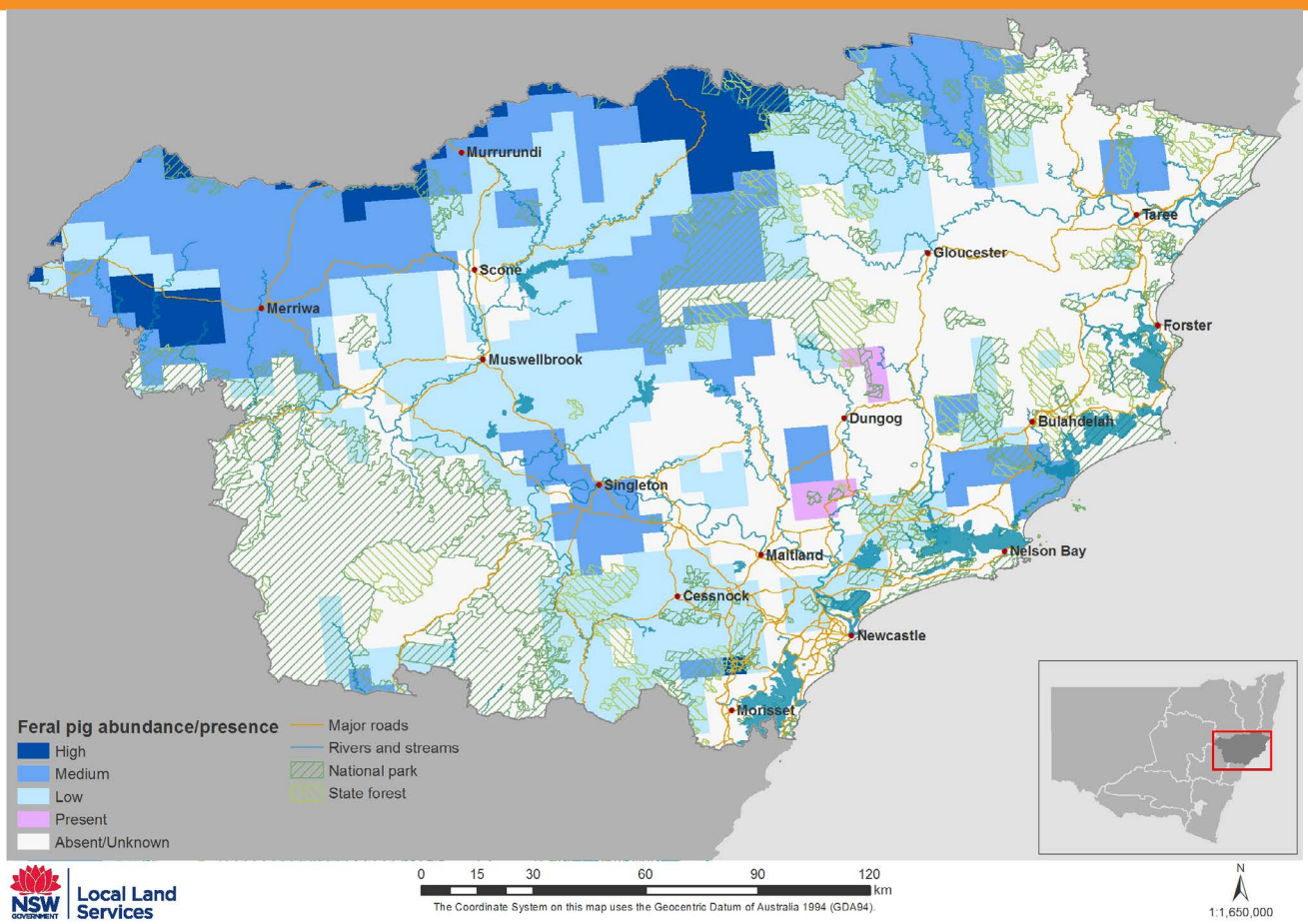


Figure 7: Map showing the distribution and density of Feral pigs in the region

Distribution data has been sourced from NSW Government agencies and collated by the NSW Department of Primary Industries in 2016.

Expectations of land managers

All land managers can reduce risks from feral pig populations on land under their care and control, by undertaking activities that:

- reduce the risk of feral pigs breeding on or being introduced to their land
- reduce the risk of feral pigs being released into the environment
- reduce the risk of feral pigs accessing easy food sources on their land
- reduce the negative impacts of feral pigs on priority assets on their land and neighbouring lands.

Examples of activities a landholder could undertake to achieve to these outcomes are:

- participating in coordinated pest animal control programs
- undertaking activities that incorporate both primary and supplementary pest animal control
- reporting any feral pig activity to neighbours and their local biosecurity ranger
- ensuring potential food sources such as carcasses, offal and food scraps are properly disposed of
- reporting any deliberate release of feral pigs or other suspicious activity to the DPI Invasive Plants and Animals Enquiry Line 1800 680 244.

Feral Pig Strategic objectives

FP1 - Reduce the negative impacts of feral pigs on agriculture and biodiversity.

FP2 - Support landholders to undertake co-ordinated control and provide training, traps and baiting products.

FP3 - Ensure a proactive approach to feral pig management and effective cross tenure co-ordination.

Program name/area	Management category Assets (where relevant)	Activities / Timeframe	Key stakeholders
Feral Pig Reduce negative impacts on grazing, cropping and biodiversity			
5.3a Manage impacts on feed (pasture damage and grain, Upper, Central and Lower Hunter)	Asset based protection – Modified and improved Pasture (FP1 to FP3)	Strategic baiting followed by aerial shooting and trapping as needed Strategic – May-August (dry periods)	Landholders, mining companies with adjoining land, LLS
5.3b Manage impacts on cropping (Merriwa-Cassilis, Greater Scone)	Asset based protection – cropping areas (FP1 to FP3)	Strategic baiting followed by aerial shooting and trapping as needed Strategic – March-October	Landholders (cropping and adjoining), LLS, mining offset areas
5.3c Manage impacts on biodiversity and threatened species - Barrington Tops NP and SCA, Goulburn River NP and neighbours	Asset Based Protection – threatened species (predation of underground tubers - Veined Doubletail Orchid (Diuris venosa) and Broad Toothed Rat (FP1 to FP3) (Mastacomys fuscus)	Trapping Strategic – Autumn-Winter	NPWS, LLS, adjoining landholders
5.3d Monitoring for the above programs	Asset based protection – effectiveness of programs (FP3)	Monitoring of programs for effectiveness and adaptive management. Cameras	Program participants
5.3e Pilot the wild dog management planning model for feral pigs	Asset based protection (FP1 to FP3)	Community engagement and feral pig management planning. End 2018	LLS, WDCG and stakeholders relevant to the pilot area
5.3f Ensure land managers understand their obligations under the Biosecurity Act to control feral pigs	Asset based protection – agriculture and biodiversity (FP3)	Community communications Ongoing	LLS, all landholders public and private
5.3g Change the reactive nature of feral pig control efforts	Asset based protection – cropping areas to improve the timing of feral pig control programs (FP3)	Targeted meetings (between cropping cycles or at times of key resource limitation (drought)	LLS, landholders in cropping areas
5.3h Compliance work	Asset based protection	Ensure proper disposal of carcasses following control	LLS, all landholders involved in control
5.3i Skills development for volunteer landholders adjoining public lands	Asset based protection – agriculture and neighbouring natural areas (FP2)	Training & skill development for landholders to incorporate adjoining public lands in their control. Provision of baits and equipment. Ongoing	LLS, public land authorities, adjoining landholders

5.4 Species – Wild Rabbit

Impacts and Distribution

Wild rabbits still have the potential to have a major impact on grazing, native flora, horticultural industries and gardens in the region. Rabbits can occupy a wide range of habitats, including native and modified grasslands, woodland, heath and forest, and can achieve high densities in some agricultural and suburban areas. Rabbits occupy the entire region (Figure 8) and all land uses except heavily forested natural areas. While controlled with the Calici virus relative to historical infestations, numbers are on the rise.

Management

The primary focus for management of rabbits is a long-term reduction in rabbit numbers in the region. This will be achieved through co-ordinated destruction of rabbit warrens and harbour in combination with baiting and release of the Calici virus, before resistance to the Calici virus in the region strengthens. Destruction of rabbit warrens and harbour will also reduce breeding sites for feral cats. LLS will:

- support landholders to meet their General Biosecurity
- release the Calici virus
- provide training resources on best practice

All landholders with warrens and harbour are expected to participate fully in coordinated programs on warren and harbour destruction in their area, especially those with warrens suited to ripping.

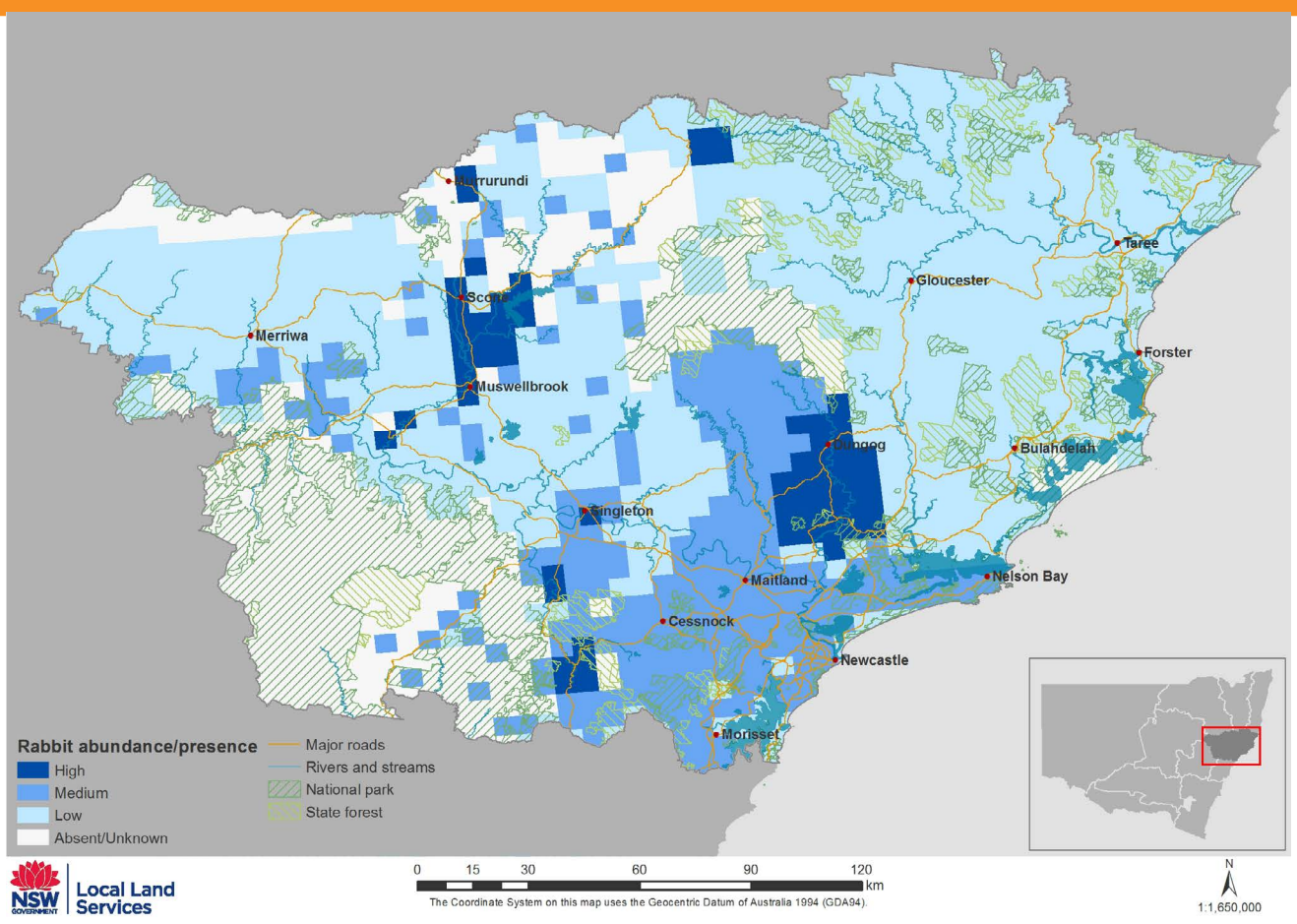


Figure 8: Map showing the distribution and density of Wild rabbits

Distribution data has been sourced from NSW Government agencies and collated by the NSW Department of Primary Industries in 2016.

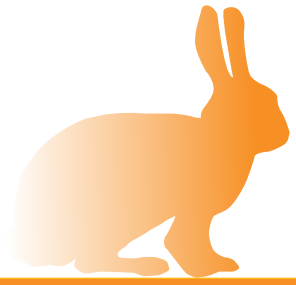
Expectations of land managers

All land managers can reduce risks from rabbit populations on land under their care and control, by undertaking activities that:

- reduce the risk of rabbits breeding on or being introduced to their land
- reduce the risk of rabbits being released into the environment
- reduce the negative impacts of rabbits on priority assets on their land and neighbouring lands.

Examples of activities a landholder could undertake to achieve to these outcomes are:

- participating in coordinated pest animal control programs
- undertaking activities that incorporate both primary and supplementary pest animal control
- reporting warrens and known harbour to their local biosecurity ranger
- keeping pet rabbits secure and euthanising unwanted animals



Wild rabbit Strategic objectives

R1 - Reduce the negative impacts of rabbits on grazing land and biodiversity through a co-ordinated program to substantially reduce rabbit numbers in the long term.

R2 - Support landholders to meet their general biosecurity duty and utilise best practice control.

Program name/area	Management category Assets (where relevant)	Activities / Timeframe	Key stakeholders
Wild rabbit Reduce negative impacts on grazing land and biodiversity			
5.4a Co-ordinated release of current bio control agent (Calici virus RHDV1 K5) Whole region	Asset based protection – adjoining grazing land and bio-diversity (R1)	Release of the agent Community communications Timing in accordance with best practice	LLS, local councils and landholders
5.4b Destroy warrens and harbour (Whole region, except urban and peri-urban)	Asset based protection – adjoining grazing land and bio- diversity (R1, R2)	Warren ripping (where possible) and harbour destruction. Baiting (1080 and pindone) Strategic – June-August (before spring breeding)	LLS, landholders
5.4c Destroy harbour (urban and peri-urban lands)	Asset based protection – adjoining grazing land, gardens, bio- diversity (R1, R2)	Harbour destruction, fumigation and baiting (pindone) Strategic – June-August (before spring breeding)	LLS, landholders, contractors, local councils, Landcare and garden groups
5.4d Monitoring for the above programs	Asset based protection – effectiveness of programs (R1, R2)	Monitoring of the effectiveness of RHDV1 K5 in controlling rabbits. Method in accordance with best practice	LLS, landholders, contractors
5.4e Ensure land managers understand their obligations under the Biosecurity Act to control rabbits	Asset based protection – adjoining grazing land and bio- diversity (R2)	Community communications Ongoing	LLS, local councils, all landholders public and private
5.4f Increase the number of people reporting warrens	Improved reporting to guide activities (R2)	Community communications	LLS, local councils, landholders
5.4g Targeted inspections and compliance	Mapping to guide compliance activities (R1, R2)	Mapping of suitable soils and compliance activities for targeted inspections	LLS, local councils, landholders

5.5 Species – Feral Cat

Impacts and Distribution

Cats are a major predation and disease transmission threat to wildlife and are a recognised threat to many threatened species. They can colonise a wide range of habitats, eat a wide range of prey, and can survive with limited access to water. Feral cats pose a serious health risk to humans, livestock and native animals as carriers of disease such as toxoplasmosis and sarcosporidiosis and are a high-risk reservoir for exotic diseases such as rabies should an outbreak in Australia occur. Cat-related toxoplasmosis can cause debilitation, miscarriage and congenital birth defects in humans, livestock and native animals.

While their exact distribution is not well known, feral cats likely occupy the entire region and all land uses and enter regional towns and built up areas at night in search of food.

Management

The primary focus of management is developing effective control strategies and techniques to reduce impacts on wildlife and disease risk to humans as current control options are limited. Control of cats will also reduce disease transmission to commercial livestock, which has been a significant issue in parts of Australia (for example Kangaroo Island). Identification and control of key breeding sites for cats and fostering responsible cat ownership are interim strategies. Municipal waste facilities (Figure 9) can be key breeding sites for both cats and foxes and rabbit warrens are potential breeding areas for cats as well as rabbits. Targeted control of these breeding areas provides integrated control of pest animals.

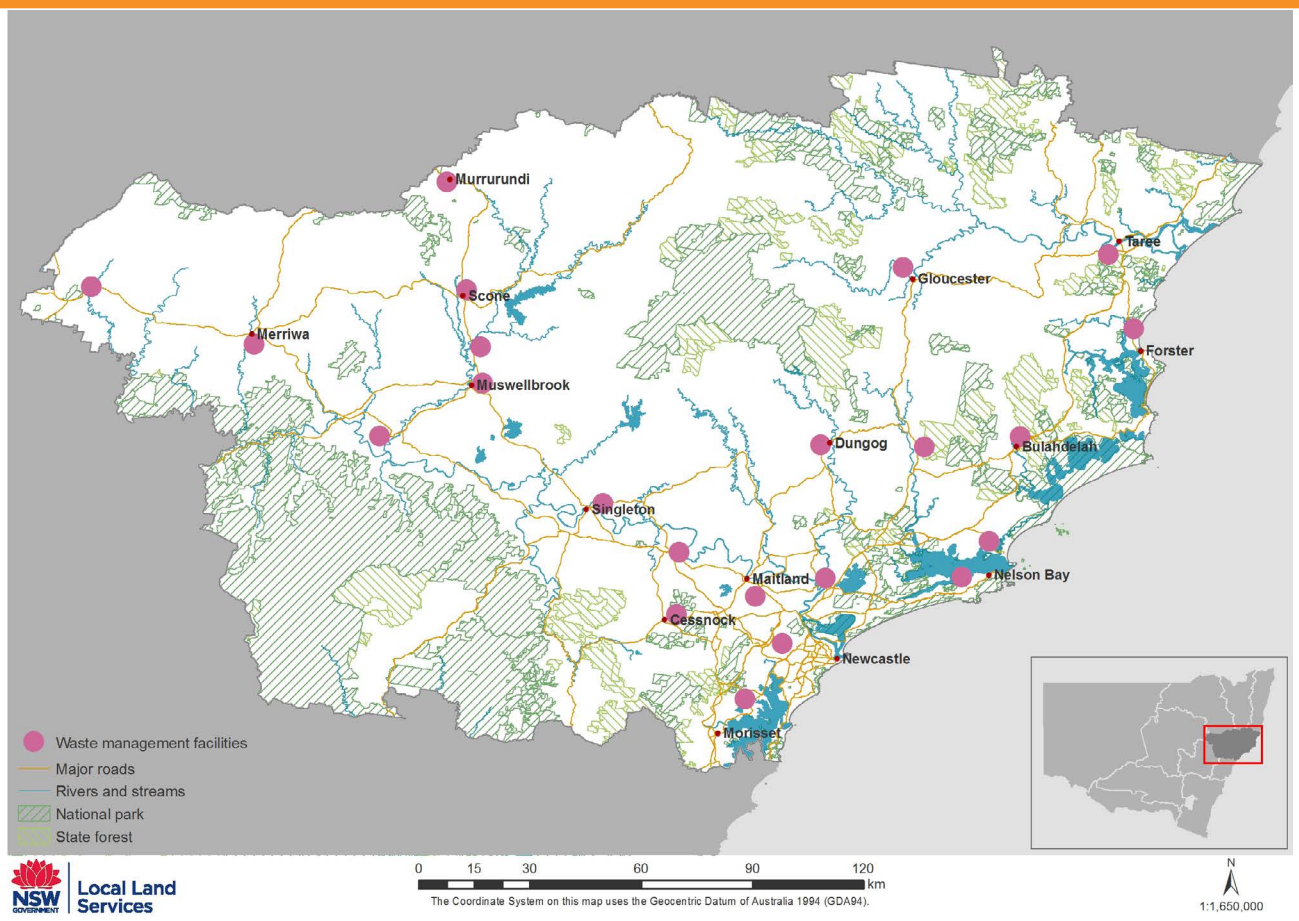


Figure 9: Map of the region showing municipal waste management facilities

Expectations of land managers

All land managers can reduce risks from feral cats on land under their care and control, by undertaking activities that:

- reduce the risk of feral cats breeding on or being introduced to their land
- reduce the risk of feral cats being released into the environment

Examples of activities a landholder could undertake to achieve to these outcomes are:

- participating in coordinated pest animal control programs
- inspecting/recording potential breeding sites like rabbit warrens, culverts etc on their land
- keeping pet cats indoors at night and euthanising unwanted animals
- reporting feral cat sightings, dumping or breeding activity to their local LLS Biosecurity ranger.

Feral cat Strategic objectives

C1 - Reduce the negative impacts of feral cats on threatened species.

C2 - Support research into effective control techniques and strategies for cats, including development of biological controls and non-lethal strategies.

C3 - Develop and resource long term programs to reduce feral cat numbers below critical thresholds to reduce impacts on biodiversity and threatened species. In the interim, effective cross tenure control will focus on identification and control of cat breeding sites and peri urban and urban areas to reduce risks to humans.

C4 – Encourage responsible cat ownership, and Local Government and Companion Animal Act controls.

C5 – Support identification and awareness of key assets in the region that are impacted by feral cats.

C6 – Integrate feral cat management with management of other feral predators wherever practical.

Program name/area	Management category Assets (where relevant)	Activities / Timeframe	Key stakeholders
Feral cat Reduce negative impacts on native species			
5.5a Key breeding sites (municipal dumps and other identified sites)	Asset based protection – biodiversity, urban/ peri urban (C1, C3, C6) communities	Trapping – Strategic, before breeding (Autumn, Spring) Monitoring - cameras (pre and post control)	Local councils, adjoining public and private landholders
5.5b Support development and trials of control methods, strategies and non-lethal solutions to reduce impacts	Asset protection - threatened species (C2, C3)	Research and field trials Ongoing	LLS, NPWS, local councils, universities and research and funding organisations
5.5c Identify priority assets for protection in the region	Asset based protection - threatened species (C3, C5)	Investigate and identify Ongoing	OEH, local experts, local councils, universities and research orgs
5.5d Modify existing monitoring	Modify existing wild dog and fox monitoring to help inform feral cat management (C5, C6)	Investigate and modify as resources permit and as opportunities are identified with wild dog control groups	LLS, NPWS, local wild dog groups
5.5e Ensure land managers understand their obligations under the Biosecurity Act	Asset based protection - threatened species (C1, C5)	Community communications Ongoing	LLS, all landholders public and private
5.5f Encourage responsible cat ownership, incorporating community based social marketing in program development	Asset based protection - threatened species (C4)	Community communications Ongoing	Local government and LLS

5.5g Improve reporting of feral cat activity and breeding sites	Asset based protection - threatened species and urban communities (C3)	Community communications and volunteer programs to identify breeding sites (such as local stormwater drains, culverts and waste dumps)	LLS, local councils, landholders and interested community members
5.5h Explore opportunities with wild dog control groups to incorporate monitoring, research and awareness of feral cats	Improve community participation in key areas for asset based protection (C6)	Community communications End 2018	LLS, landholders, WDAs

5.6 Species – Feral Goat

Impacts and Distribution

Feral goats are a major agricultural and environmental pest, but also a commercial resource, providing income to farmers who muster them for sale. Feral goats compete with sheep and some native animals for pasture, contribute to land degradation through grazing and browsing and impact on biodiversity by damaging the vegetation and competing with native animals. The main feral goat populations in the region are in the Upper Hunter local government area. Feral goats are generally less common towards the coast, occurring in smaller more isolated populations (Figure 10).

Management

At present control of feral goats in the region is primarily through commercial harvesting (mustering and selling). Private land managers need to understand the relationship between the density of feral goats and the damage they cause, so they can maximise the benefits versus the costs of management and negative impacts on the land and environment. Management of feral goats on public lands is necessary from time to time to reduce impacts on threatened species (such as Brush Tailed Rock wallaby and orchids). Isolated populations on public lands will be removed entirely wherever possible and where mustering is supported, removal is to be complete. Where mustering is not practical on public lands, aerial shooting will be considered.

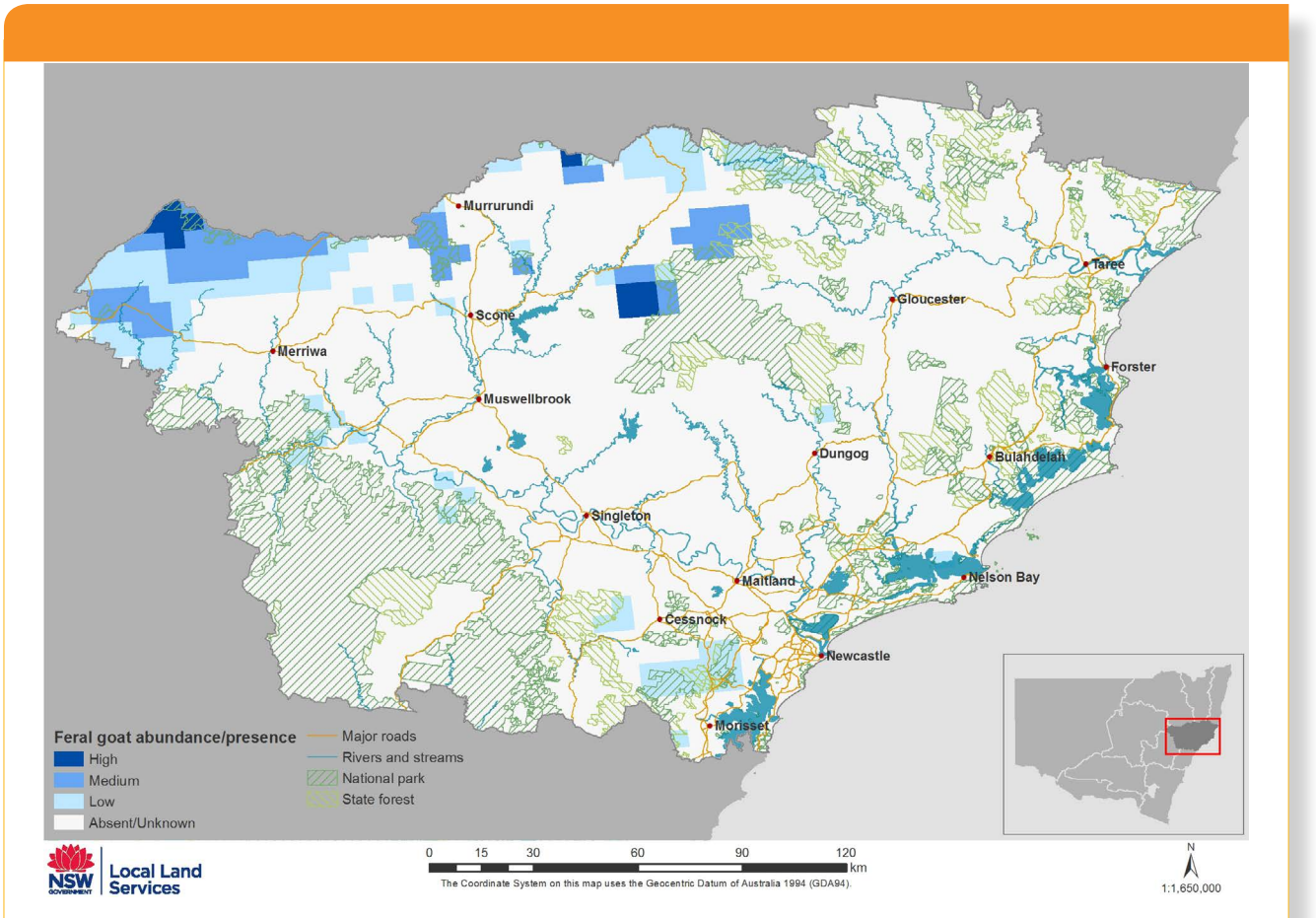


Figure 10: Feral goat distribution in the region

Distribution data has been sourced from NSW Government agencies and collated by the NSW Department of Primary Industries in 2016.

Expectations of land managers

All land managers can reduce risks from feral goat populations on land under their care and control, by undertaking activities that:

- reduce the risk of feral goats being released into the environment
- reduce the negative impacts of feral goats on biodiversity assets on their land and neighbouring lands.

Examples of activities a landholder could undertake to achieve to these outcomes are:

- participating in coordinated pest animal control programs
- undertaking activities that incorporate both primary and supplementary pest animal control
- reporting any feral goat sightings outside the mapped distribution to their local biosecurity ranger and Feralscan
- ensuring pet goats and livestock remain on their land.

Feral goat Strategic objectives

FG1 - Reduce the negative impacts of feral goats on biodiversity.

FG2 - Support commercial harvesting consistent with reducing impacts on biodiversity.

FG3 - Ensure a proactive approach to feral goat management and effective cross tenure co-ordination.

Program name/area	Management category Assets (where relevant)	Activities / Timeframe	Key stakeholders
Feral goat Reduce negative impacts biodiversity			
5.6a Manage impacts on threatened species and conservation lands - (Wollemi NP)	Asset based protection – Brush Tailed Rock wallaby (FG1)	Contract mustering, aerial shooting (NPWS only) and Trapping (dry periods only) Responsive all year	NPWS, Forestry Corporation, public authorities, LLS, neighbouring landholders, contractors
5.6b Investigate feasibility of eradicating this sub-population Alum mountain and Bulahdelah area	Asset based protection – threatened species (orchids) FG1 to FG3)	Contract mustering where possible, aerial shooting where required and feasible	Forestry Corporation (except for aerial shooting), public authorities, Aboriginal community, LLS, neighbouring landholders, contractors
5.6c Monitoring for the above programs	Asset based protection – program implementation (FG3)	Monitoring for effectiveness. Cameras	Program participants
5.6d Ensure land managers understand their obligations under the Biosecurity Act to control feral goats	Asset based protection – agriculture and biodiversity (FG3)	Community communications Ongoing	LLS, all landholders public and private

5.7 Species – Wild Deer, Sambar

Impacts and Distribution

Sambar deer are a large deer species that can have major impacts on farm infrastructure (fencing), vineyards and horticultural crops. They form large wallows in natural waterways and browse native flora. All larger deer species are a significant public safety risk with a history of serious vehicle collisions in the region. The distribution of Sambar deer in the region is presently very limited (Figure 11) but will expand if left unmanaged. The area shown in red is the approximate containment zone for a key population around Cessnock. This approximate containment zone will be ground-truthed and specific boundaries identified. Another population has been identified in the Coopernook area and will be further investigated.

Management

The focus of management is on containing the current Cessnock population and reducing collision risks and agriculture impacts within the containment zone. Control techniques for Sambar are limited and more effective strategies and control methods are needed. The current limited distribution provides an important opportunity to minimise further spread (and therefore impacts) until more effective control methods are developed. All landholders with feral deer on their property in or adjoining the containment zone will be asked to participate in coordinated programs (such as providing access for shooting). Item 5.7l is an enabling action for the control of all deer species.

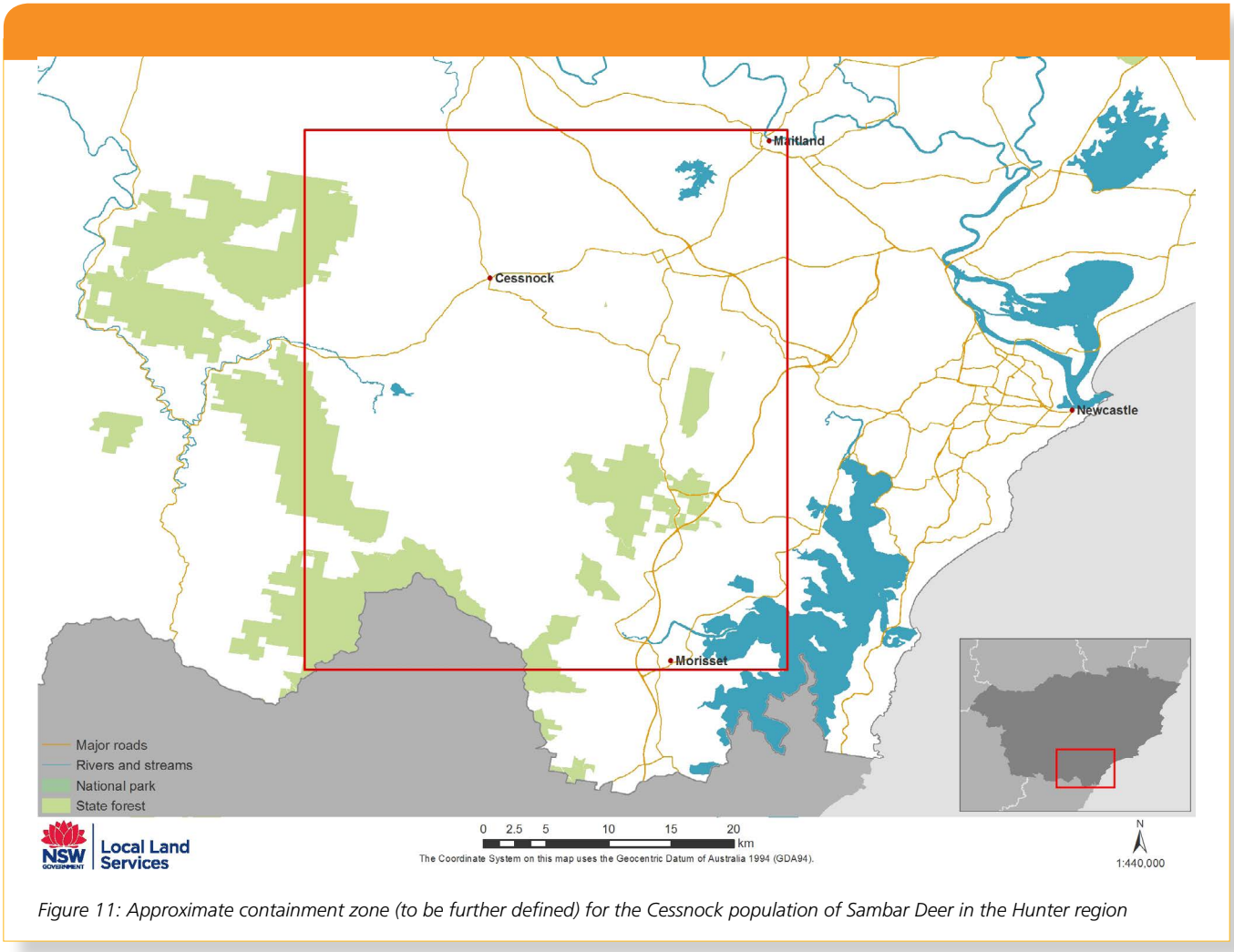


Figure 11: Approximate containment zone (to be further defined) for the Cessnock population of Sambar Deer in the Hunter region

Expectations of land managers

All land managers can reduce risks from Sambar deer populations on land under their care and control, by undertaking activities:

- In the containment zone: - that continually suppress and destroy Sambar deer on their land.
- Outside the containment zone that:
- reduce the risk of Sambar deer breeding on or being introduced to their land
- reduce the risk of Sambar deer being released into the environment

Examples of activities a landholder could undertake to achieve to these outcomes are:

- participating in coordinated pest animal control programs
- undertaking activities that incorporate both primary and supplementary pest animal control
- reporting any Sambar deer activity outside the containment zone to their local biosecurity ranger
- reporting any deliberate release of Sambar deer (or other suspicious activity) to the DPI Game Licensing Unit and report any road related incidents or near misses to local police.
- Tagging pet deer or livestock, ensuring they remain on their land and euthanising unwanted animals

Sambar deer Strategic objectives

SD1 – Contain Sambar deer populations to reduce further spread.

SD2 - Reduce negative impacts of Sambar deer on road safety, horticulture, viticulture and biodiversity within Containment zones.

SD3 - Ensure a proactive approach to Sambar deer management and effective cross tenure co-ordination.

SD4 – Support and advocate for increased research on control and impacts for this and other deer species.

SD5 – Develop and resource a long-term program to eradicate populations.

Program name/area	Management category Assets (where relevant)	Activities / Timeframe	Key stakeholders
Sambar deer Reduce negative impacts on road safety, horticulture, viticulture and biodiversity within containment zone			
5.7a Road safety - Cessnock - Coopernook, ground-truth and review Map extent of each population and dispersal pathways	Containment - public safety, reduce vehicle collision risk (SD1, SD2) - Identify high risk pathways for Sambar deer dispersal beyond containment zones	Targeted control and public safety measures Public safety awareness campaign	Local councils, RMS, local police, LLS, public and private landholders
5.7b Manage Cessnock population - agriculture and high priority biodiversity assets - adopt complementary strategies such as exclusion fencing for key assets	Containment and asset protection within containment zone and perimeter - viticultural, horticultural and biodiversity assets (SD2)	Ground shooting and aerial shooting Strategic – May and Sept/Oct to minimise spring damage to vines and align with rut Consultation, field days and communications on adoption of complementary strategies	Local councils, landholders, LLS, Forestry Corporation, Crown Lands, winegrowers, NPWS Horticultural and viticultural industry groups affected landholders and research organisations
5.7c Manage Coopernook population - Coopernook, ground-truth and review feasibility - Control and contain population if feasible	Containment and asset protection within containment zone and perimeter (SD2)	Ground shooting and aerial shooting Strategic – May and Sept/Oct to align with rut	Mid Coast Council, landholders, LLS, Forestry Corporation, Crown lands, NPWS

5.7d Monitor identified dispersal pathways and develop preventative options	Containment and public safety (SD3)	Community communications and monitoring with remote cameras with the assistance of local landholders and volunteers. Ongoing	LLS, public and private landholders, wine and horticultural industries, Cessnock and Lake Macquarie city councils and police
5.7e Targeted surveillance around outside of the containment zone	Containment (SD3)	Community communications and engagement Ongoing	LLS, all landholders public and private, Cessnock and Lake Macquarie city councils
5.7f Skills development for landholder volunteers	Containment (SD3) - monitoring any dispersal from the containment zone	Training and support in monitoring and surveillance for landholders (including those neighbouring public lands). Ongoing	LLS, public land authorities, neighbouring landholders
5.7g Monitoring for above programs	Asset based protection within containment zone – program implementation	Monitoring for effectiveness. Cameras	Program participants
5.7h Map high priority biodiversity assets	Containment - identify biodiversity assets to protect within and adjoining containment zone (SD3)	GIS mapping in consultation with NPWS, Local councils, and local experts in the community. August 2018	NPWS, LLS, Cessnock and Lake Macquarie city councils, and identified experts
5.7i Research on effective control techniques and impacts for deer	Control and (SD4) management – Advocate and support increased research	Supporting targeted research programs to improve control options and manage impacts	LLS, NPWS, DPI, research organisations and funding bodies
5.7j Trial new control techniques (for all deer species)	To increase efficiency and options for control (SD5)	Pilot control programs, supported by research, funding opportunities and effective monitoring	Horticultural and viticultural industry groups, affected landholders, research and funding organisations
5.7k Ensure land managers understand their obligations under the Biosecurity Act	Asset based protection – agriculture and biodiversity (SD3)	Community communications Ongoing	LLS, all landholders public and private
Sambar deer Outside containment zone			
5.7l Lift restrictions on deer control activities that don't apply to other pest animals. In all Local Government Areas except Newcastle and Maitland City councils	Control SD1, 2+3 RudD2+3 FD1+2 RD1+2	Application to the Department of Primary Industries to have the Game and Feral Animal Control Act 2002 regulations suspended as they relate to hunting of wild deer	LLS, RPAC, local councils

5.8 Species – Wild Deer, Rusa

Impacts and Distribution

Rusa deer are a large invasive deer species that can cause significant damage to farm infrastructure (fencing) and gardens and present a significant vehicle collision risk to travellers on the Pacific Highway near Coolongolook and to a lesser extent Karuah. They also form large wallows in natural waterways. Herbivory and environmental degradation by deer is a key Threatening process in NSW. ¶

There are three localised populations of Rusa in the region, most likely established by illegal release. These are around Gresford, Karuah and Coomba park, with several serious vehicle accidents involving Rusa deer at the two coastal populations (Figure 12). At the northern end of the Coomba park population, Red deer are also present.

Management

The focus of management for Rusa is to reduce impacts on public safety and limit further spread until improved control methods are available. A secondary focus is protection of agriculture, biodiversity and urban-peri urban assets within the Coomba park population.

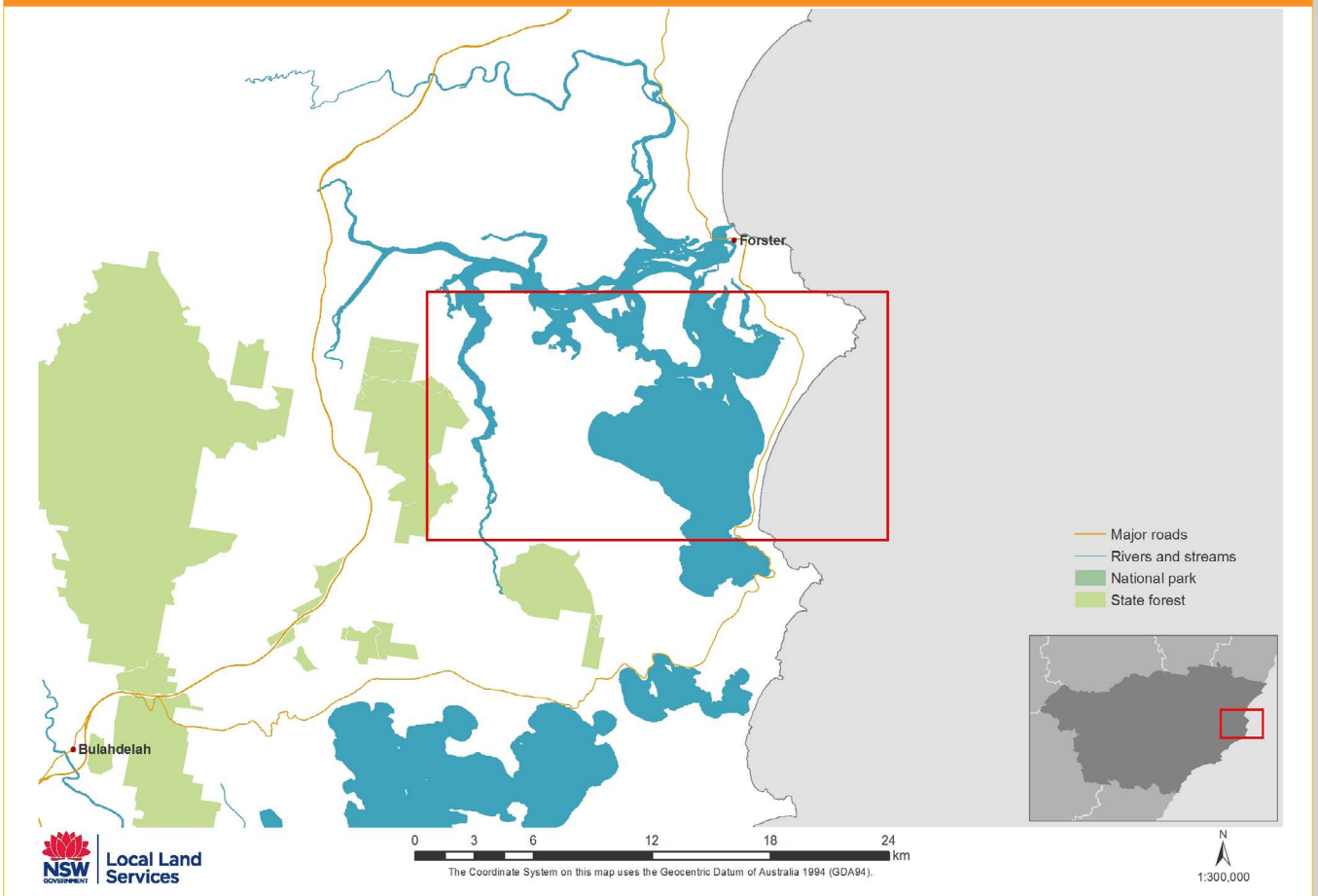


Figure 12: Map showing the approximate location of a control priority for Rusa Deer in the region

Expectations of land managers

All land managers can reduce risks from Rusa deer populations on land under their care and control, by undertaking activities that:

- reduce the risk of Rusa deer breeding on or being introduced to their land
- reduce the risk of Rusa deer being released into the environment
- reduce the negative impacts of Rusa deer on priority assets on their land and neighbouring lands.

Examples of activities a landholder could undertake to achieve to these outcomes are:

- participating in coordinated pest animal control programs
- undertaking activities that incorporate both primary and supplementary pest animal control
- reporting any Rusa deer sightings or activity outside the mapped distribution to their local LLS Biosecurity ranger, any deliberate release of Rusa deer or other suspicious activity to the DPI Game Licensing Unit and any road related incidents or near misses to local police.
- ensuring pet deer or livestock are tagged and remain on their land and euthanising unwanted animals.

Rusa deer Strategic objectives

RuD1 – Contain the Coomba park population as much as possible to reduce further spread.

RuD2 - Reduce negative impacts of Rusa deer on road safety, grazing land and biodiversity in mapped area.

RuD3 - Ensure a proactive approach to Rusa deer management and effective cross tenure co-ordination.

RuD4 – Support and advocate for increased research on control and impacts for this species.

Program name/area	Management category Assets (where relevant)	Activities / Timeframe	Key stakeholders
Rusa deer Reduce negative impacts on grazing land and biodiversity and improve public safety			
5.8a Public safety - reduce vehicle collision risk - Coomba Park	Asset based protection - public safety (RuD2)	Public safety awareness campaign and investigate feasibility of targeted control	Mid Coast Council, local police, LLS, public and private landholders
5.8b Investigate population and feasibility to manage impacts - agriculture, urban/ peri and bio-diversity. Coomba Park	Asset based protection (manage population) – agricultural, urban/ peri and identified high priority biodiversity assets (RuD2)	Investigate feasibility of ground shooting and aerial shooting Strategic –Sept-Oct (during the rut)	Mid Coast Council, LLS, NPWS, landholders, LLS,
5.8c Implement control and containment program if warranted by feasibility assessment	Asset based protection (manage population) – public safety, urban/ peri, agricultural and high priority bio-diversity assets (RuD2 and 3)	Applications for funding to support any feasible co-ordinated program	Mid Coast Council, LLS, RMS, NPWS, Forestry Corporation, funding bodies
5.8d Monitoring for the above programs	Asset based protection – program implementation	Monitoring for effectiveness. Cameras	Program participants
5.8e Map and ground truth extent of the population and dispersal pathways	Management of the population (RuD3)	GIS mapping in consultation with NPWS, local councils, and local experts in the community. August 2018	NPWS, LLS, local councils, and identified experts
5.8f Monitor identified dispersal pathways and develop preventative options	Management of the population and public safety (RuD3)	Community communications and monitoring with remote cameras and assistance of local landholders. Ongoing	LLS, public and private landholders, wine and horticultural industries, local councils and police
5.8g Adoption of long term solutions – such as exclusion fencing for key assets	Asset based protection - support and encourage (RuD3, 4)	Consultation and field days	Affected landholders, Mid Coast Council, LLS and research organisations

Program name/area	Management category Assets (where relevant)	Activities / Timeframe	Key stakeholders
5.8h Ensure land managers understand their obligations under the Biosecurity Act to control Rusa deer	Asset based protection – agriculture, peri urban and biodiversity (RuD3)	Community communications Ongoing	LLS, all landholders public and private
5.8i Targeted surveillance outside of mapped extent	Containment (RuD3)	Community communications and engagement Ongoing	LLS, all landholders public and private, local councils

5.9 Species – Wild Deer, Fallow

Impacts and Distribution

Fallow deer like most deer species impact on biodiversity, agriculture, horticulture and forestry and present a significant collision risk, especially when becoming habituated with humans in peri-urban areas. Fallow deer are the most widespread deer species in the region and are estimated to outnumber red deer in the region by at least 5 to 1. They are common throughout the centre of the region north-south, but the Manning Great Lakes district is largely free of Fallow deer (Figure 13). Fallow deer can reach high densities, with up to 25 per square km in the Upper Hunter.

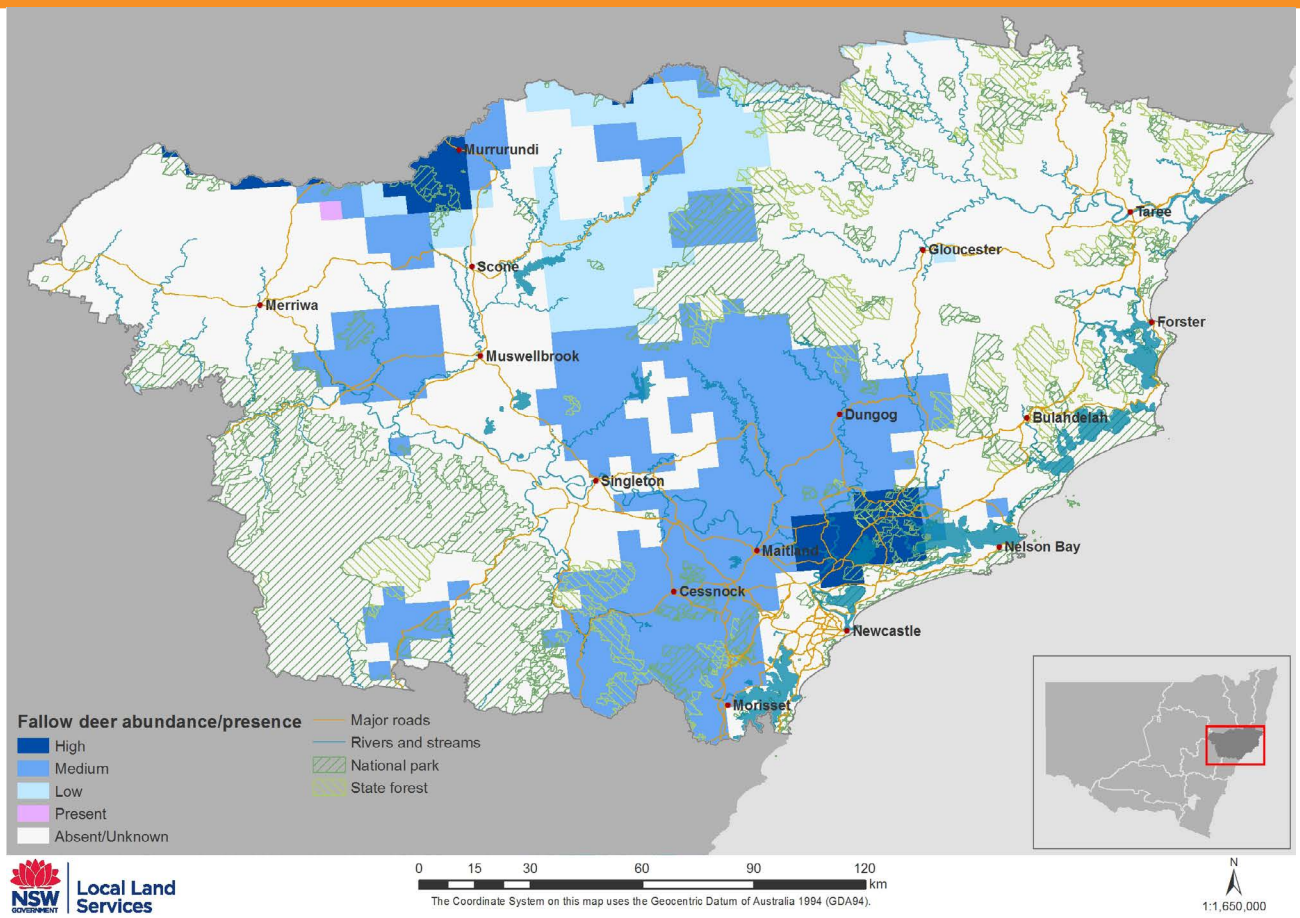


Figure 13: Distribution of Fallow Deer in the region

Distribution data has been sourced from NSW Government agencies and collated by the NSW Department of Primary Industries in 2016.

Management

Fallow deer are having major impacts on grazing areas in the region where locally abundant and in peri-urban areas. The focus is on asset protection for grazing and more proactive management of fallow deer near and in per-urban areas to reduce the risk of collision and other risks to humans.

Expectations of land managers

All land managers can reduce risks from Fallow deer populations on land under their care and control, by undertaking activities that:

- reduce the risk of Fallow deer breeding on or being introduced to their land
- reduce the risk of Fallow deer being released into the environment
- reduce the negative impacts of Fallow deer on priority assets on their land and neighbouring lands.

Examples of activities a landholder could undertake to achieve to these outcomes are:

- participating in coordinated pest animal control programs
- undertaking activities that incorporate both primary and supplementary pest animal control
- reporting any Fallow deer sightings or activity outside the mapped distribution to their local LLS Biosecurity ranger, any deliberate release of Fallow deer or other suspicious activity to the DPI Game Licensing Unit and any road related incidents or near misses to local police.
- ensuring pet deer or livestock are tagged and remain on their land and euthanising unwanted animals.

Fallow deer Strategic objectives

FD1 – Reduce negative impacts of Fallow deer on public safety, grazing and cropping land.

FD2 – Ensure a proactive approach to deer management and support landholders to control Fallow deer.

FD3 – Support and advocate for increased research on control for this and other deer species.

Program name/area	Management category Assets (where relevant)	Activities / Timeframe	Key stakeholders
Fallow deer Reduce negative impacts on grazing land and biodiversity and improve public safety			
5.9a Public safety - reduce vehicle collision risk in peri urban areas identified as a priority	Asset based protection - public safety (FD1)	Public safety awareness campaign and supporting more proactive control by landholders in priority areas	Local councils, local police, LLS, public and private landholders
5.9b Seek external funding	Asset based protection – grazing (FD2)	Applications for funding to enable co-ordinated aerial culling programs	LLS, NPWS, Forestry Corporation, funding bodies
5.9c Co-ordinated culling program to manage impacts on agriculture (subject to funding) - Upper & Lower Hunter	Asset based protection – grazing (FD2)	Ground shooting Strategic – March to June (during mating season and post) Responsive (all year)	LLS, landholders, NPWS, Forestry Corporation, commercial shooters, funding bodies
5.9d Monitoring for the above programs	Asset based protection – program implementation	Monitoring for effectiveness. Cameras	Program participants

5.9e Adoption of complementry solutions – such as exclusion fencing for key assets	Asset based protection (FD1, FD2)	Consultation and field days	Affected landholders, Mid Coast Council, LLS and research organisations
5.9f Resources to support landholders in managing Fallow deer impacts	Asset based protection - cropping and grazing (FD2)	Community communications and engagement. Ongoing	LLS, landholders public and private
5.9g Ensure land managers understand their obligations under the Biosecurity Act to control Fallow deer	Asset based protection – agriculture, urban, peri urban and biodiversity (FD2)	Community communications Ongoing	LLS, all landholders public and private

5.10 Species – Wild Deer, Red

Impacts and Distribution

Red deer are a larger deer species that tends to herd and stay closer to more open areas. Like most deer species they impact on biodiversity, agriculture, horticulture and forestry and present a significant collision risk. Mature males can be quite dangerous around the mating season, especially when becoming habituated with humans in peri-urban areas. While more widespread than Sambar or Rusa, significant parts of the region remain free of Red deer (Figure 14). Recognised as one of the world's 100 worst invasive species by the International Union for Conservation of Nature, Red deer seem less invasive in the Hunter, remaining more localised to the original incursion. Most red deer in the region are believed to be sourced from farm escapes or from failed deer farms that unfortunately, released stock into the wild.

Management

Red deer are having major impacts on cropping areas to the west of the region and are becoming an increasing problem along the Liverpool range in the Upper Hunter. The focus of management is asset protection for cropping in the west of the region and more proactive management of red deer near and in per-urban areas to reduce the risk of collision and other risks to humans.

Wild deer (Credit: ACT Parks and Conservation)

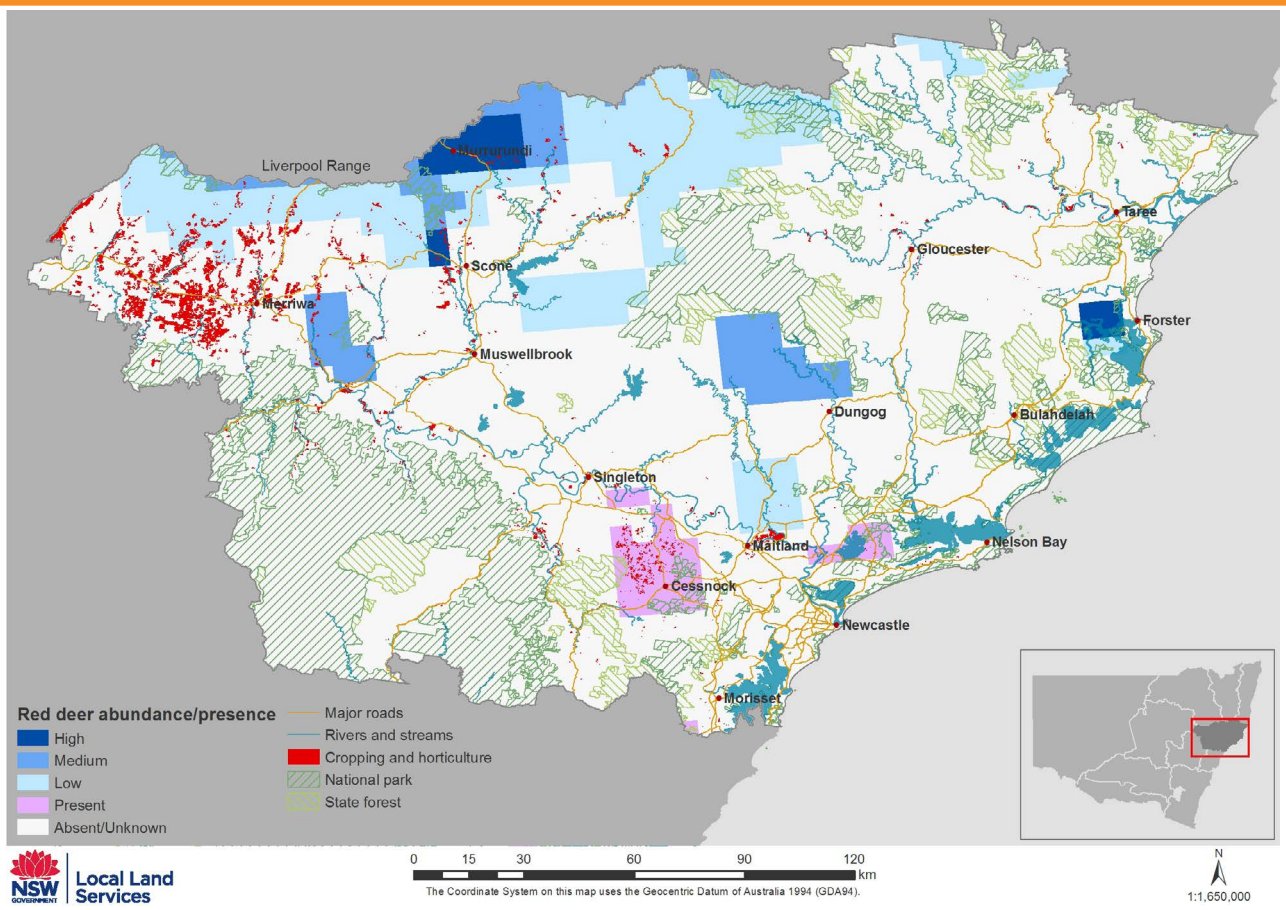


Figure 14: Distribution of Red deer showing cropping areas in the region

Distribution data has been sourced from NSW Government agencies and collated by the NSW Department of Primary Industries in 2016.

Expectations of land managers

All land managers can reduce risks from Red deer populations on land under their care and control, by undertaking activities that:

- reduce the risk of Red deer breeding on or being introduced to their land
- reduce the risk of Red deer being released into the environment
- reduce the negative impacts of Red deer on priority assets on their land and neighbouring lands.

Examples of activities a landholder could undertake to achieve to these outcomes are:

- participating in coordinated pest animal control programs
- undertaking activities that incorporate both primary and supplementary pest animal control
- reporting any Red deer sightings or activity outside the mapped distribution to their local LLS Biosecurity ranger and any deliberate release of Red deer or other suspicious activity to the DPI Game Licensing unit
- ensuring pet deer or livestock are tagged and remain on their land and euthanising unwanted animals.

Red deer Strategic objectives

RD1 – Reduce negative impacts of Red deer on public safety, cropping and grazing land.

RD2 – Ensure a proactive approach to deer management and support landholders to control Red deer.

RD3 – Support and advocate for increased research on control for this and other deer species.

Program name/area	Management category Assets (where relevant)	Activities / Timeframe	Key stakeholders
Red deer Reduce negative impacts on grazing and cropping land and improve public safety			
5.10a Public safety - reduce vehicle collision risk in Peri urban areas identified as a priority	Asset based protection - public safety (RD1)	Public safety awareness campaign and supporting more proactive control by landholders in priority areas	Local Councils, local police, LLS, public and private landholders
5.10b Seek external funding	Asset based protection – cropping and grazing along Liverpool range RD2)	Applications for funding to enable co-ordinated culling programs Ongoing	LLS, NPWS, Forestry Corporation, funding bodies
5.10c Co-ordinated culling program to manage impacts on agriculture (subject to funding) - Upper Hunter	Asset based protection – cropping and grazing along the Liverpool range (RD2)	Ground shooting Strategic – March to June (during the rut and post) Responsive (all year)	LLS, landholders, NPWS, Forestry Corporation, commercial shooters, funding bodies
5.10d Monitoring for the above programs	Asset based protection – program implementation	Monitoring for effectiveness Cameras	Program participants
5.10e Adoption of complementary strategies – such as exclusion fencing for key assets	Asset based protection (RD2, RD3)	Consultation and field days	Affected landholders, Mid Coast Council, LLS and research organisations
5.10f Develop best practice standards for farmed deer in the region (for all deer species)	Asset based protection (RD2) - fencing, tagging and other requirements to minimise and manage escapes	Consultation and standards development. Standards to apply to all deer species	Affected landholders, LLS, industry and research organisations
5.10g Resources to support landholders in managing Red deer impacts	Asset based protection - cropping and grazing (RD2)	Community communications and engagement Ongoing	LLS, landholders public and private
5.10h Ensure land managers understand their obligations under the Biosecurity Act to control Red deer and deer farmers adopt best practice	Asset based protection – agriculture, peri urban and biodiversity (RD2)	Community communications and compliance activities Ongoing	LLS, all landholders public and private

5.11 Species – Wild Horse

Impacts and Distribution

Wild horses are large hoofed animals that can have serious impacts on plants, wetlands, streams and native animals, especially in sensitive environments and they spread weeds. They can also be a danger to humans, especially on roads.

Australia has the largest population of wild horses in the world and community perspectives on horses in our environment vary substantially. The distribution of wild horses in the Hunter is limited to a few distinct populations, most notably Barrington tops, Glenrock station and the Singleton military area. All are inland, except for an isolated population near the coast at Nerong, south west of Bulahdelah (Figure 15).

Management

The focus of management will be on reducing the risk to public safety as much as possible and protecting sensitive environments. Removal of an isolated population such as Nerong, is an important opportunity to minimise further spread, impacts and the costs of ongoing control. The Nerong population adjoins the Pacific Highway (A1) and three known horse related road accidents including two fatalities, have already occurred in the area.

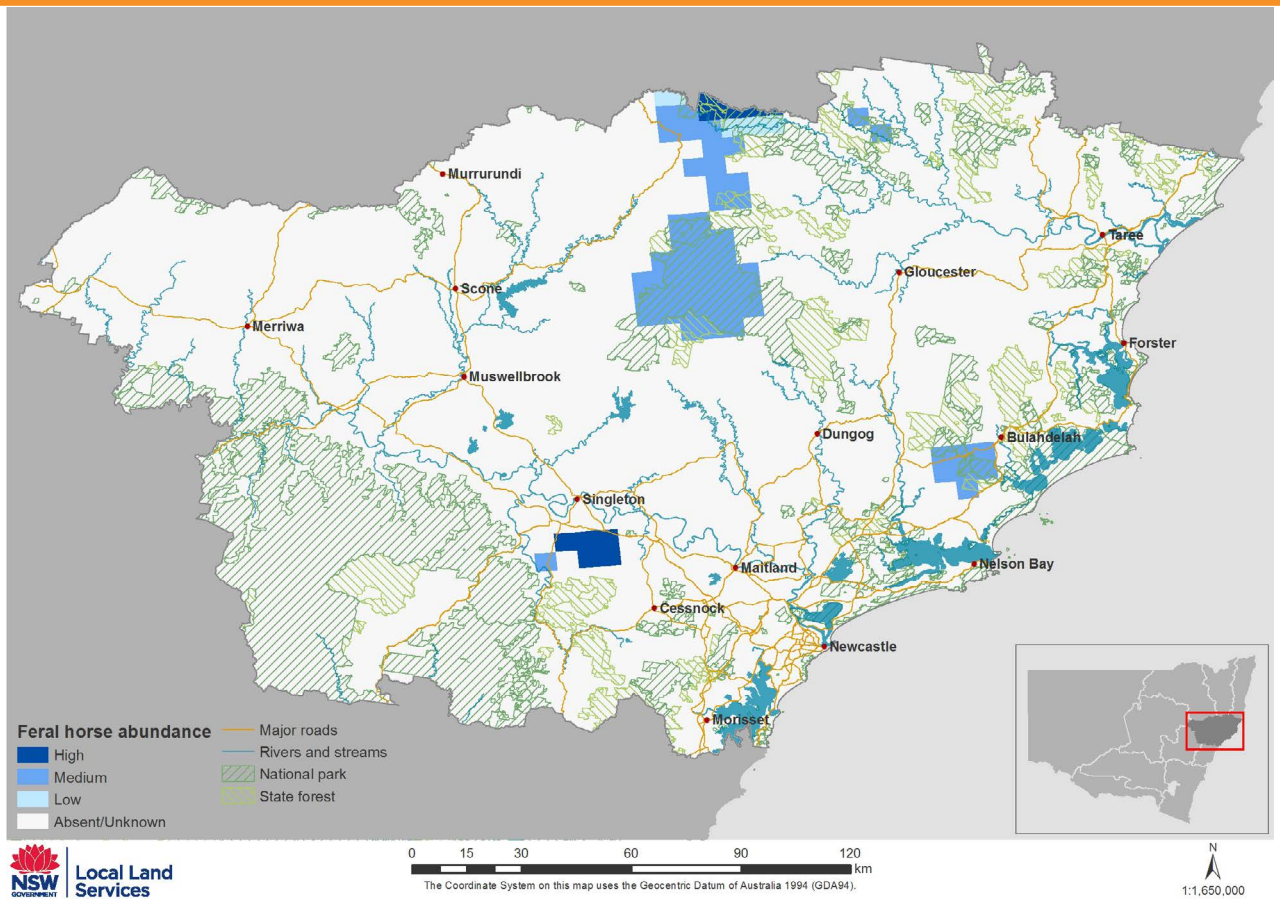


Figure 15: Distribution of Wild horse in the region

Distribution data has been sourced from NSW Government agencies and collated by the NSW Department of Primary Industries in 2016.

Expectations of land managers

All land managers can reduce risks from wild horse populations on land under their care and control, by undertaking activities that:

- reduce the risk of wild horses breeding on or being introduced to their land
- reduce the risk of wild horses being released into the environment
- reduce the negative impacts of wild horses on priority assets on their land and neighbouring lands.

Examples of activities a landholder could undertake to achieve to these outcomes are:

- participating in coordinated pest animal control programs
- undertaking activities that incorporate both primary and supplementary pest animal control
- reporting wild horse sightings or activity outside the mapped distribution to their local LLS Biosecurity ranger and any road related incidents or near misses to local police
- ensuring horses are identifiable (branded) and remain on their land and euthanising unwanted animals.

Wild horse Strategic objectives

WH1 - Reduce negative impacts of Wild horse on public safety, biodiversity and grazing land.

WH2 - Ensure a proactive approach to Wild horse management and effective cross tenure co-ordination.

Program name/area	Management category Assets (where relevant)	Activities / Timeframe	Key stakeholders
Wild horse Reduce risks to public safety and negative impacts on grazing land and biodiversity			
5.11a Public safety - reduce collision risk - Nerong	Asset based protection (manage population) - public safety Remove population (WH1)	Co-ordinated control to remove the Nerong population. On NPWS lands activities will comply with the NPWS Horse Management Procedures	NPWS, Forestry Corporation, LLS, Mid Coast Council, RMS, local police, adjoining landholders
5.11b Public safety - reduce collision risk - Scone-Gloucester Road -Tubrabucca Road	Asset based protection (manage population) - public safety (WH1)	Public safety awareness campaign and supporting more proactive control by landholders in these priority areas. On NPWS lands activities will comply with the NPWS Horse Management Procedures	NPWS, Forestry Corporation, Mid Coast and Upper Hunter councils, RMS, local police, adjoining landholders
5.11c Manage impacts on Barrington Tops in conjunction with neighbours	Asset based protection – Montane Wetlands and Broad-toothed Rat (WH1)	Methodology to be discussed in consultation with agencies and interest groups	NPWS, Forestry Corporation, adjoining landholders
5.11d Singleton Military area	Asset based protection - biodiversity (WH1)	Trapping in association with Brumby groups	Australian Army, LLS, adjoining landholders
5.11e Monitoring for the above programs	Asset based protection – program implementation	Monitoring for effectiveness Cameras	Program participants
5.11f Map and ground truth extent of Nerong population and dispersal pathways	Management of the Nerong population (WH2)	GIS mapping in consultation with NPWS, Mid Coast Council, and local experts in the community. August 2018	NPWS, LLS, Mid Coast Council, and identified experts
5.11g Monitor identified dispersal pathways and develop preventative options	Management of the Nerong population and public safety (WH2)	Community communications and monitoring with remote cameras and the assistance of local landholders and volunteers. Ongoing	NPWS, LLS, public and private landholders, wine and horticultural industries, local councils and police
5.11h Targeted surveillance around Nerong	To reduce further spread (WH2)	Community communications and engagement. Ongoing	NPWS, LLS, Mid Coast Council, all landholders public and private
5.11i Ensure land managers understand their obligations under the Biosecurity Act to control wild horse	Asset based protection – agriculture, peri urban and biodiversity (WH2)	Community communications Ongoing	LLS, all landholders public and private

5.12 Feral bird species - management of bird pests

Impacts and Distribution

Some feral bird species are significant environmental and agricultural pests (for example European starling). They cause damage to the environment through selective feeding, predation and competition for resources (such as hollows and food), destroy and contaminate horticultural and viticultural crops or damage infrastructure through nest building and defecation in urban environments. A wide range of feral bird species have established in the region with some species now very familiar to landholders and regarded as beneficial (such as the Cattle egret). Many feral bird species are now very widespread, including Indian myna which is aggressive to native species and prefers human modified environments.

Management

Control is best undertaken on an as needs basis by landholders. The primary focus of management is to support and educate landholders on managing agricultural bird pests as needed (that is to protect assets). In general, due to their mobility and the localised nature of impacts on primary production, property level asset protection is a more effective strategy for most pest birds. Co-ordinated control is not the primary focus of management as it is for other vertebrate pests.

Expectations of land managers

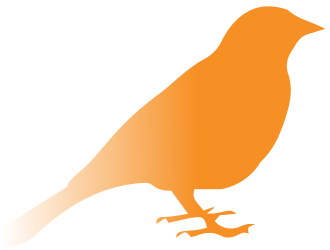
All land managers can reduce risks from feral bird populations on land under their care and control, by undertaking activities that:

- reduce the risk of feral birds breeding on their land
- reduce the risk of feral birds being released into the environment
- reduce the risk of feral birds accessing easy food sources on their land
- reduce the negative impacts of feral birds on priority assets on their land.

Examples of activities a landholder could undertake to achieve these outcomes are:

- controlling feral birds seen to be nesting/breeding on their land or as control opportunities present
- being aware of alert species and reporting any unusual birds or known feral bird activity to neighbours and the Invasive Plants and Animals Enquiry Line: Ph: 1800 680 244
- ensuring potential food sources such as grain are properly covered
- keeping pet birds securely and euthanising unwanted birds.

Indian-myna (Credit: Sporting Shooters Association of Australia)



Feral Birds Strategic objectives for management of bird pests

B1 - Reduce the negative impacts of feral birds on high value agriculture and biodiversity.

B2 – Support landholders to manage localised impacts on high value agriculture.

B3 – Support research on effective control methods and complementary strategies.

B4 – Monitor and review emerging species for possible co-ordinated control or response.

Program name/area	Management category Assets (where relevant)	Activities / Timeframe	Key stakeholders
Feral Birds Support any State-wide control program and associated monitoring			
5.12a Indian Myna - further investigate potential control strategies for this widespread species	Asset protection - high value agriculture and biodiversity (B4)	Investigate whether there is any potential for effective control and consult with experts and key stakeholders End 2019	RPAC, relevant experts (formal and informal) and key stakeholders
5.12b Further investigate population extent and potential control strategies for the following limited distribution species: - Peafowl - Helmeted Guineafowl	Containment (B4)	Investigate further and consult with experts and key stakeholders Examine funding options End 2019	RPAC, relevant experts (formal and informal) and key stakeholders
5.12c Remove populations of the following limited distribution species (subject to above): - Peafowl - Helmeted Guineafowl	Containment (remove populations) (B1)	Co-ordinated control to remove isolated populations of these species End 2020	LLS, local councils, NPWS and other public and private landholders
5.12d Monitor and review emerging species	Asset protection - monitoring and review for possible co-ordinated control or response (B4)	Community communications and monitoring with the assistance of local landholders and volunteers Ongoing	LLS, public and private landholders and industry groups
5.12e Support use of protective netting and other strategies and development of new control methods and complementary strategies	Asset protection - high value agriculture and biodiversity (B3)	Pilot control programs, supported by research, funding opportunities and effective monitoring	Horticultural and viticultural industry groups, affected landholders, research and funding organisations
5.12f Resources to support landholders	Asset protection (B2) – high value agriculture	Resources and community communications supporting landholders to manage impacts. Ongoing	LLS, landholders, industry organisations

5.13 Feral fish species

Impacts and Distribution

Feral fish species can have major impacts on freshwater ecosystems and native species, through predation, competition for resources (such as food and breeding grounds) and changes to freshwater environments (such as increasing turbidity and the balance of species). Common carp are a major environmental fish pest that was once confined to rivers west of the Great divide but has since been introduced to many coastal catchments. They now occur in every major catchment in the region. Other feral fish species have also established in the region with some species now very familiar to landholders or sought after by anglers (such as Brown and Rainbow trout). One species (Platy Fish) is limited to one discrete population in the Lower Hunter.

Management

Almost all fish species are difficult to control once established and its essential we avoid further incursions. Species such as the Tilapia (not yet established, see alert list) have the potential to be a major problem. Simple care in the proper disposal of unwanted fish and alertness to unusual species can lead to great savings for our community and the lifeblood of our land (our waterways).

Biological controls require a major investment in time and resources and extensive testing to ensure off target risks are minimal and can be managed. However, they can offer a solution for control of widespread feral fish species in the same way the Calici virus has enabled widespread control of rabbits. A biological control has been developed for common carp.

Expectations of land managers

All land managers can reduce risks from feral fish, by undertaking activities that:

- reduce the risk of feral fish being released into the environment
- reduce the negative impacts of feral fish on priority assets on their land and neighbouring lands.

Examples of activities a landholder could undertake to achieve these outcomes are:

- keeping pet fish and aquarium materials securely away from areas subject to flooding
- euthanising unwanted fish and properly disposing of unwanted aquarium materials away from water bodies
- being aware of alert species and reporting any unusual fish sightings to the Invasive Plants and Animals Enquiry Line: Ph: 1800 680 244
- participating in any coordinated feral fish control programs in their area.

Feral fish species - Strategic objectives

C1 – Support any State-wide control program and associated monitoring.

C2 – Respond quickly to any new incursions to reduce negative impacts on freshwater ecosystems.

Program name/area	Management category Assets (where relevant)	Activities / Timeframe	Key stakeholders
Feral fish Support any State-wide control program and associated monitoring			
5.13a Support any State-wide biological control program for Common carp	Asset protection – freshwater ecosystems (C1)	Communications DPI and SPAC on program timing Ongoing. Active participation in program	LLS, RPAC, all relevant stakeholders
5.13b Investigate options to prevent further spread of Platy fish - Lower Hunter	Containment (C2)	Community and landholder engagement	DPI, local landholders

5.13c Monitor and review emerging species	Monitoring and review for possible co-ordinated control or response (C2)	Community communications and monitoring with the assistance of local landholders. Ongoing	LLS, public and private landholders, local councils and recreational fishers
5.13d Provide resources on how to manage carp and other species	Asset protection – freshwater ecosystems (C1)	Community communications and engagement. Timeframe - subject to any State-wide program	LLS, landholders, industry organisations

5.14 Plan implementation

Effective implementation of the Regional Strategic Pest Animal Management Plan (RSPAMP) will require collaboration between key stakeholders, the community and investors. The Hunter Regional Pest Animal Committee (RPAC) and Hunter Local Land Services (LLS) Board will oversee implementation, monitoring, evaluation and reporting.

Operational plans will be the basis of implementation and this section provides some key considerations for implementing this plan.

Operational planning

Local pest animal management and other operational plans are a key element in implementing the plan. Operational plans will identify:

- key stakeholders and local groups involved and how balanced outcomes will be achieved
- roles and responsibilities in delivery and how responsibility will be shared across tenures
- costs and benefits and any priorities for additional funds
- evidence base (e.g. pest distribution, activity, impacts, local risk) for identified priorities and programs
- control techniques, timing of control activities and best practice
- community engagement and communication processes

Prioritising activities

This is an ambitious plan embracing the need for new directions in pest control. Some priorities can be addressed with existing funding, and others require alternate or new funding. Priorities for implementation will be set through RPAC and the Hunter Local Land Services Board. In general, the highest priority actions in the plan for implementation will be those that address:

- legislative requirements (such as the Biosecurity Act)
- current commitments (such as implementing existing operational plans or funded activities)
- critical risks to the region's assets
- essential enabling activities or public safety.

Monitoring of programs is essential and will be undertaken whenever programs are implemented. Remaining actions will be implemented in due course consistent with investor priorities, available funding and priorities set through RPAC and the Hunter Local Land Services Board.

Implementing control

In implementing this plan, the full range of control options available, including complementary (non-lethal) methods and incentives will be considered.

Control in peri-urban and urban environments is complex because control options are more limited, people's livelihoods aren't always dependent on the land and a greater range of issues have to be considered in implementing pest management. As a result, these areas can act as refugia for pests. Partnerships with local councils and peri-urban communities are essential in managing pests and achieving long-term improvements.

Well established best management practice and management tools are documented for many pest species (see PestSmart and NSW DPI webpages). However, best practice isn't established for all pest species and for some control options are very limited (for example cats and deer). Supporting and staying up to date with research on control options, especially for those species where current control options are limited, is important. This plan seeks to address those knowledge and practice gaps and foster use of best practice in all pest management activities.

Community capacity

Plan implementation relies on community support and ownership and community groups can play a wide range of roles in supporting effective pest management. Opportunities for partnerships with the community in pest management and training in pest management activities must be supported.

It is also essential that we support landholder capacity and make it easier for landholders to participate in pest management. Item 5.1k is about looking for opportunities to streamline processes for landholders in implementing and notifying neighbours under a 1080 pest control order.

Roles and partnerships

Partnerships with local councils, community groups and many others will be essential to improve outcomes and foster more integrated control. Local councils are already functioning under the Biosecurity Act and are the control authority with respect to weeds. Many councils are also active in pest management especially in urban and peri-urban areas. Greater clarity on the roles for stakeholders is important and partnerships with local government will be formalised to support more integrated and effective pest management.

Where cross regional pest management issues arise, LLS boards are the appropriate bodies to engage with to resolve them.

6. Measuring success and continuous improvement

The development and monitoring toward key performance indicators (KPIs) is a critical component of this plan. Monitoring indicators provides information needed to:

- identify priorities for immediate and future management planning
- evaluate previous or current programs (including both control and community engagement activities)
- improve understanding and knowledge about pest animal densities, current and potential range and their current and potential impacts
- raise community awareness of current and potential problems and opportunities for prevention and control.

Objectives and performance indicators as set for each of the pest and programs are outlined in 6.1 below. Outcomes under this plan will contribute to outcomes under the Hunter Local Land Services Local Strategic Plan and stakeholder strategic plans.

6.1 Key performance indicators

Key performance indicators (KPIs) have been set to ensure practices are effective and achieving outcomes. These are focussed on regional implementation of programs to deliver effective outcomes for the pest animals outlined in the plan, and more direct measurement of outcomes is needed. State-wide objectives and metrics for key species and goals will be formulated over the next 12 months to ensure a stronger link to outcomes and collaboration of regional planning efforts. These state-wide objectives will align with overarching goals and objectives set across plans and will be informed by overarching plans such as the NSW Invasive Species Plan and NSW Biosecurity Strategy.

The KPIs set in this plan will be monitored and reviewed annually to ensure targeted progress on key programs and pest animals and continuous improvement.

6.1.1 State-wide KPIs

Providing a coherent story about the impact of RSPAMPs across the State will require a coordinated Monitoring, Evaluation, Reporting and Improvement (MERI) framework. This will focus regional MERI programs to targeted evaluations on important outcomes which can be aggregated to a State level to provide information on changes in pest animal density and distribution and its impact on economic, social and environmental issues. Differences in detectability of some species and outcomes, will be considered in reporting and metric design.

Objective	Indicator	Timeframe
Develop consistent State-wide pest animal data metrics	Metrics are developed and RPACs are reporting on the metrics in a consistent manner	Implemented by July 2019
Develop a consistent MERI process for this plan	MERI process established to guide monitoring and management of pest animals in NSW for oversight by SPAC	Implemented by July 2019

6.1.2 Species KPIs

While State level pest animal indicators are in development, the KPIs we will use to track the performance of this plan are as follows. The focus of these KPIs will be on performance of the plan and the effectiveness of our strategies in managing pest animals.

All species

Objective	Indicator	Timeframe
Improving partnerships and integration in pest management	Number new partnerships Number of integrated programs	End 2019

Wild dog

Objective	Indicator	Timeframe
WD1 - Reduce the negative impacts of wild dogs on stock and landholders, utilising best practice WD3 - Support landholders to undertake co-ordinated control, ensuring landholders are accredited to use 1080 and provide training	Co-ordinated control programs delivered	End 2018
WD2 - Ensure all areas of the region are covered by best practice wild dog management plans and serviced by effective cross tenure co-ordination	No. of wild dog groups established No. of plans established	End 2018

European red fox

Objective	Indicator	Timeframe
F1 - Reduce the negative impacts of foxes on stock, utilising best practice F2 - Support landholders to undertake co-ordinated control, ensuring land holders are accredited to use 1080 and provide training on effective control	Co-ordinated control programs delivered No. of wild dog management groups that are including fox control activities ¶	End 2018
F3 - Develop and resource long term programs to reduce fox numbers below critical thresholds to reduce impacts on biodiversity and protect threatened species. In the interim, effective cross tenure control will focus on supporting SoS program priority sites and actions and peri urban areas	Co-ordinated control programs addressing interim priorities delivered No. of fox dens reported Develop and resource long term programs	End 2018 End 2021

Feral pig

Objective	Indicator	Timeframe
FP1 - Reduce the negative impacts of feral pigs on agriculture and biodiversity FP2 - Support landholders to undertake co-ordinated control and provide training, traps and baits	Co-ordinated control programs delivered Pilot wild dog management planning model for feral pigs completed	End 2018 End 2019
FP3 - Ensure a proactive approach to feral pig management and effective cross tenure co-ordination	No. of targeted meetings and communications to change the reactive nature of feral pig control	End 2019

Wild rabbit

Objective	Indicator	Timeframe
R1 - Reduce the negative impacts of rabbits on grazing land and biodiversity through a co-ordinated program to substantially reduce rabbit numbers in the long term	Co-ordinated releases of Calici virus undertaken Co-ordinated control programs to destroy warrens and harbour delivered	End 2019
R2 - Support landholders to meet their general biosecurity duty and utilise best practice control	Targeted community education programs and products delivered	End 2019

Feral cat

Objective	Indicator	Timeframe
C1 - Reduce the negative impacts of feral cats on threatened species	Co-ordinated control programs at known breeding sites delivered Identify priority assets for protection in the region	End 2019 End 2020
C4 – Encourage responsible cat ownership, and use of Local Government and Companion Animal Act controls	Targeted community education programs	End 2019

Feral goat

Objective	Indicator	Timeframe
FG1 - Reduce the negative impacts of feral goats on biodiversity FG2 - Support commercial harvesting consistent with reducing impacts on biodiversity FG3 - Ensure a proactive approach to feral goat management and effective cross tenure co-ordination	Co-ordinated control programs (5.6a) delivered Actions undertaken to investigate eradication of sub-population at Alum mountain/Bulahdelah	End 2020

Sambar deer

Objective	Indicator	Timeframe
SD1 – Contain Sambar deer populations to reduce further spread	Co-ordinated control programs delivered Mapping of population extent and dispersal pathways	End 2020 End 2019
SD2 - Reduce negative impacts of Sambar deer on road safety, horticulture, viticulture and biodiversity within the Containment zones	Targeted public safety awareness campaigns and education products delivered	End 2019

Rusa deer

Objective	Indicator	Timeframe
RuD1 – Contain the Coomba park population as much as possible to reduce further spread	Feasibility of co-ordinated control investigated with stakeholders	End 2020
RuD2 - Reduce negative impacts of Rusa deer on road safety, grazing land and biodiversity in the mapped area	Targeted public safety awareness campaigns and education products delivered	End 2020

Fallow deer

Objective	Indicator	Timeframe
FD1 – Reduce negative impacts of Fallow deer on public safety, grazing land and cropping land in the Upper Hunter	Funding applications lodged Funded control programs implemented Targeted public safety awareness campaigns and education products delivered	End 2019 End 2020
FD2 – Ensure a proactive approach to deer management and support landholders to control Fallow deer	Targeted education products and resources to support landholders in understanding their general biosecurity duty and managing Fallow deer impacts delivered	End 2019

Red deer

Objective	Indicator	Timeframe
RD1 – Reduce negative impacts of Red deer on public safety, cropping and grazing land in the Upper Hunter	Funding applications lodged Funded control programs implemented Targeted public safety campaigns and education products delivered	End 2019 End 2020
RD2 – Ensure a proactive approach to deer management and support landholders to control Red deer	Targeted education products and resources to support landholders in understanding their general biosecurity duty and managing Red deer impacts delivered Best practice standards for farmed deer in the region developed (for all deer species)	End 2019 End 2020

Wild horse

Objective	Indicator	Timeframe
WH1 - Reduce negative impacts of wild horse on public safety, biodiversity and grazing land	Community consultation on control of wild horse in Barrington tops Co-ordinated control programs delivered for public safety (Nerong) Targeted public safety campaigns (Nerong, and Scone-Gloucester and Tubrabucca Roads) and education products delivered	End 2021 End 2020
WH2 - Ensure a proactive approach to wild horse management and effective cross tenure co-ordination	Extent of the Nerong population mapped and ground-truthed	End 2019

Feral Birds

Objective	Indicator	Timeframe
B1 - Reduce the negative impacts of feral birds on high value agriculture and biodiversity	Potential to control widespread species Indian myna investigated	End 2019
B2 – Support landholders to manage localised impacts on high value agriculture	Communication products and resources to assist landholders delivered	End 2019
B4 – Monitor and review emerging species for possible co-ordinated control or response	Distribution, impacts and potential control strategies for limited distribution species Peafowl and Helmeted guineafowl investigated	End 2019

Feral fish

Objective	Indicator	Timeframe
C1 – Support any State-wide control program and associated monitoring	State-wide programs supported	End 2021
C2 - Respond quickly to any new incursions to reduce the negative impacts of feral fish on freshwater ecosystems	Investigations and consultation completed for Platy fish	End 2020

6.2 Measuring performance

Reporting will occur on an annual basis based on the indicators identified in this plan. A formal monitoring, evaluation, reporting and investigation process will be implemented by July 2019 to improve regional and State-wide collaboration and reporting on pest animal indicators across NSW. Improved intelligence on key pest animals will lead to more efficient management tools and outcomes.

6.3 Plan review

Ongoing evaluation and adaptation is an important element of adaptive management and the Regional Pest Animal Committee will periodically review the plan and its implementation. A mid-term review of this plan will be undertaken at year three (2021) and a full review will be undertaken nearing the end of the five-year term for this plan (2023).

7. The Biosecurity Act

The Biosecurity Act is a new piece of legislation that allows improved management of biosecurity risks in NSW to enable landholders, community, industry and Government effectively manage and respond to biosecurity incursions and risks. A fundamental principle of the Biosecurity Act is that biosecurity is everyone's responsibility. All land managers, regardless of whether on private or public land, have the same responsibilities. Likewise, the general community have a role to play in reducing risks through their activities and as 'eyes and ears' on the lookout for any potential new risks (such as Alert species listed in section 1.8 or the illegal spread of pest species to new areas by people). A general biosecurity duty under the Act requires that anyone who knows or ought to reasonably know about a biosecurity risk has a duty to prevent, eliminate or minimise that risk as far as reasonably practicable.

The *NSW Biosecurity Act 2015* includes a number of mechanisms (regulatory tools, see Figure 16) that can be used to manage biosecurity risks such as pest animals in NSW. Landholders, industry and community should be familiar with these tools and what they require of them in their daily practices.

Further information in the NSW Biosecurity legislation can be found at the NSW DPI website

http://www.dpi.nsw.gov.au/biosecurity/biosecurity-legislation

Regulatory tools: NSW Biosecurity Act 2015

Biosecurity Regulation 2017 - Biosecurity Regulation (NLIS) 2017 - Biosecurity Order (Permitted Activities) 2017

General Biosecurity Duty: Managing the impact and spread of pest animals.
E.g. You are discharging your GBD if you are implementing an on-farm biosecurity plan

Biosecurity Management Tools

PROHIBITED MATTER	Listed in Schedule 2 of the Act. It is an offence to deal with prohibited matter. If a person becomes aware of, or suspects the presence of prohibited matter they have a duty to prevent, eliminate or minimise the risk or potential risk it may cause E.g. Hendra Virus, Foot and mouth Disease, Avian Influenza
CONTROL ORDER	Can be made by the Minister or delegate to establish a control zone, establish measures in connection with a control zone to prevent, eliminate minimise and manage a biosecurity impact. e.g. Disposal of contaminated stock to prevent entering the food chain
PROHIBITED DEALING	A dealing with biosecurity matter described in Schedule 3 of the Act. e.g. Non indigenous animals such as African Pygmy Hedgehog
BIOSECURITY ZONES	A zone established to a premises, specified area or part of the state to prevent, eliminate, minimise or manage a biosecurity risk or impact. Generally used where longer term management is required. e.g. Phylloxera Exclusion Zone in Riverina
BIOSECURITY DIRECTIONS: GENERAL	Issued by an authorised officer to the general public or class of persons e.g. at a sale yard
BIOSECURITY DIRECTIONS: INDIVIDUAL	Issued to a single person by an authorised officer, either orally (followed up in writing within 7 days) or by notice in writing. e.g. A direction to a landholder to implement Foot rot program
BIOSECURITY UNDERTAKINGS	A negotiated set of actions agreed to by an individual and accepted by an authorised officer. Both parties are signatories

Figure 16: Regulatory tools of the NSW Biosecurity Act 2015

8. Further information

Plan to manage biosecurity risks

This plan can be used by landholders and community members to understand, manage and mitigate risks associated pest animal management in the region. Organisations may choose to apply for funding/allocate resources to support strategic pest animal projects.

The landholder activities outlined in this plan can be used by relevant landholders and community members in the area as guidelines for discharging their general biosecurity duty to improve pest animal management. Pest animal requirements under the Biosecurity Order Permitted Activities, which is updated from time to time, should also be considered by landholders and the general community.

Use this plan as a guide to mitigate your risks in your on-farm biosecurity plan to ensure you are effectively managing pest animals in the most effective and efficient manner.

Educate yourself

While this plan sets a benchmark for integrated pest animal management across the region, there are a number of alternative mechanisms that can be used to meet individual's general biosecurity duty. Individuals are encouraged to utilise the following resources as well as contact their Local Land Services office for further information.

Resources:

- Local Land Services
- Office of Environment and Heritage (National Parks and Wildlife)
- Department of Primary Industries
- Invasive Animals CRC
- PestSmart Connect
- FeralScan.

Monitor your environment

- Be aware of changes in the landscape around you. Report anything unusual.
  - » If you become aware of unusual animals in the wrong place or suspected illegal activities such as the deliberate release of pest animals into the environment, report it to the **Invasive Plants and Animals Enquiry Line Ph 1800 680 244.**
  - » If you notice any unusual animal disease or symptoms or pests of plants, contact the **Emergency Animal Disease Hotline Ph 1800 675 888** or the **Plant Pests Hotline Ph 1800 084 881** (Option 1) as appropriate.
- Discuss ongoing monitoring programs and techniques with Local Land Services.
- Ensure you keep up to date with any Government and industry changes.

Comply

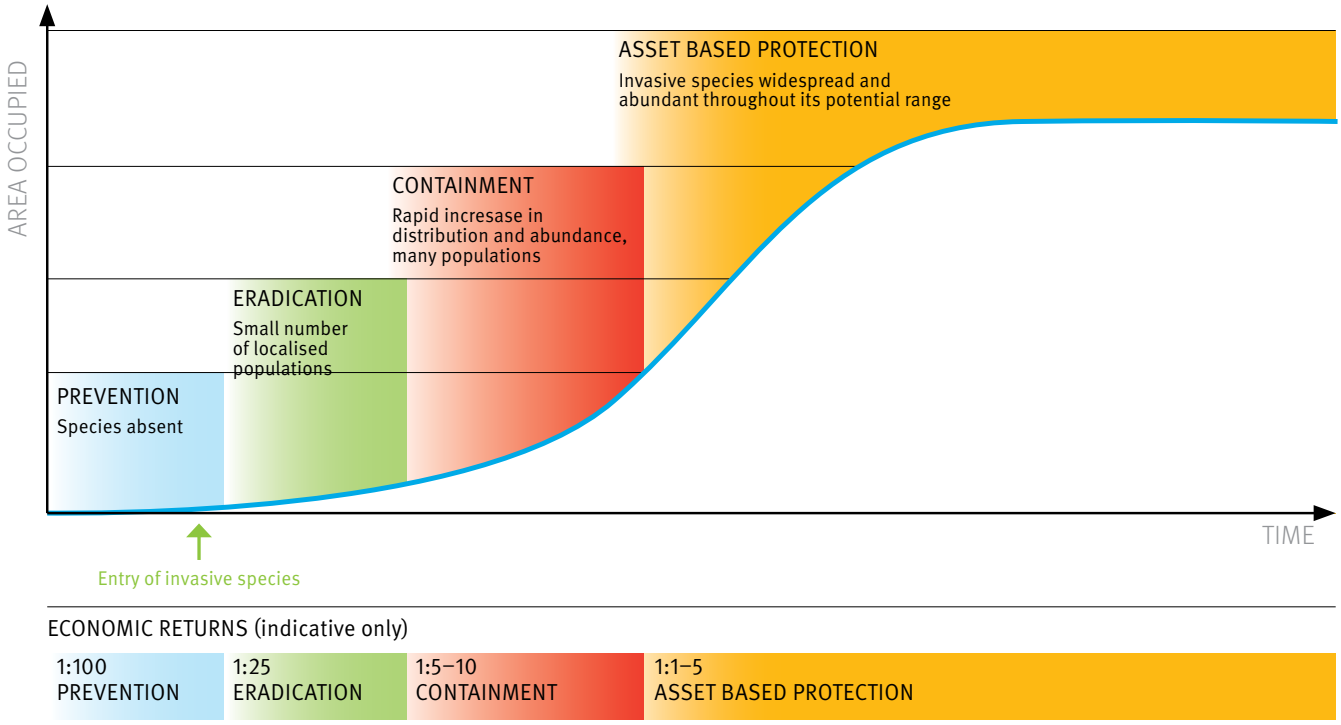
- Ensure you meet the requirements set out in both your on-farm biosecurity plan and other on farm biosecurity plans for properties you deal with.
- Ensure you are aware of and comply with specific legislation for pest animals.

Appendix 1: Prioritisation Guidelines

This appendix covers the guidelines used in prioritising species in section 5 of this plan. Public and private land managers have limited resources to manage pest animals and it is therefore important to prioritise activities. Important considerations for prioritisation are:

- It is generally more cost-effective to prevent the establishment of pest animals into new areas through prevention and early intervention (eradication or containment of small isolated populations) than to have to fund ongoing management of established species (see Figure 17).
- For established species, resources should focus on managing the pest animals and areas where there is the greatest impact on a valued 'asset' (e.g. protecting an endangered native animal from fox predation or a sheep production area from wild dogs) – this is known as 'Asset-based Protection'.
- The feasibility of management needs to be considered and this will depend on the availability of approved cost-effective control techniques and any biogeographic limitations (e.g. difficult terrain or potential impact of control techniques on non-target species).

Generalised invasion curve showing actions appropriate to each stage



*Invasion Curve sourced from Biosecurity Victoria, Department of Primary Industries, Victoria

Source: Invasion Curve sourced from NSW Invasive Species Plan 2018-2021 and Department of Primary Industries, Victoria

Figure 17: The 'Invasion Curve', showing the importance of allocating resources to prevent the establishment of new pests. (Agriculture Victoria)

In developing lists of priority pest animals and management areas, this plan has considered the South Australian Pest Animal Risk Management Guide and prioritisation tool:

http://pir.sa.gov.au/__data/assets/pdf_file/0017/254222/SA_pest_animal_risk_assessment_guide_Sept2010.pdf

The South Australian prioritisation tool accounts for pest animal impacts and the feasibility of effectively reducing those impacts and allocates management of particular pest animals in particular areas into one of four categories: Limited Action, Asset-based Protection, Containment or Eradication.

'Limited Action' will be the likely management approach for introduced species that aren't considered to have a significant impact in a particular area and/or for which there is currently a lack of effective management options. There are 64 terrestrial and freshwater aquatic exotic vertebrates that have established wild populations in NSW (Table 1); however, many of these will fall into the 'Limited Action' category and the focus of RPAMPs will be on a much smaller list of high priority pest impacts.

In general, 'Eradication' or 'Containment' are only realistic management options for new incursions and small isolated populations of species and where effective control techniques are available.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