Queensland Weed and Pest Animal Strategy 2016–20

Queensland Government

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Summary

Weeds and pest animals have significant impacts on the environment, the economy (in particular agriculture) and the community (including human health and recreation). The objectives of managing invasive species are to prevent new introductions and to minimise the negative impacts of these species on the environment, the economy and the community.

The purpose of this strategy is to establish a statewide planning framework that will address the environmental, economic and social impacts of Queensland's current and potential weeds and pest animals. The development and implementation of this strategy is based on the management principles of integration, public awareness, commitment, consultation and partnership, planning, prevention and early intervention, best practice and improvement (research, monitoring and evaluation).

The management of weeds and pest animals is the shared responsibility of land managers, industry, the community and all levels of government. While the primary responsibility rests with the land manager, collective action using a nil-tenure approach—which engages all stakeholders—is best practice, particularly for mobile species.

Vision

Weed and pest animal impacts on the environment, the economy and the community are cooperatively managed.

Mission

To establish and perpetuate effective cooperative management of the impacts of Queensland's weeds and pest animals.

Desired outcomes

Six desired outcomes have been developed to achieve the vision and to provide the means for undertaking the mission:

- Prevention and early intervention
- Monitoring and assessment
- Awareness and education
- Effective management systems
- Strategic planning framework and management
- Commitment, roles and responsibilities

Contents

Vision 1

Mission 1

Desired outcomes 1

Definitions 3

Abbreviations 4

Introduction 5

Background 5

New and recent incursions 5

Impacts 5

Control programs 8
Purpose **9**
Scope **9**
Context **10**
Development **11**
Combination of the strategies 13
Principles and best practice **14**
Strategic plan **16**
Vision 16
Mission 16
Desired outcomes, objectives and actions 16
Prevention and early intervention 17
Monitoring and assessment 18
Awareness and education 19
Effective management systems 20
Strategic planning framework and management 21
Commitment, roles and responsibilities 22
Stakeholder roles and responsibilities 23
Australian Government 23
Queensland Government 24
Local Government 24
Land managers (public and private) 24
Community groups 24
Industry organisations 24
NRM groups 24
Tertiary and other education research facilities 24
Management arrangements 24
Terms of reference 25
References **25**
Appendix 1: Pest animal management outcomes and actions (by species) **26**
Appendix 2: Weed management outcomes and actions **28**
Appendix 3: Maps of containment areas **33**

Definitions

asset something with environmental, social or economic value, whether publicly or privately owned, that weeds or pest animals may directly or indirectly affect

asset-based approach a management approach based on the relative value of identified assets that will be protected by management actions

asset protection action taken to mitigate the impacts or consequences of a weed or pest animal species on specified assets in a predefined area (e.g. indirect protection such as exclusion fencing for rabbits, wild dogs or foxes); not necessarily direct control, reduction or destruction of the species

biosecurity matter **1** a living thing other than a human or part of a human **2** a pathogen that can cause disease in a living thing other than a human or in a human by transmission from an animal to a human **3** a disease **4** a contaminant

carrier anything—dead or alive, biological or inanimate—that is carrying or has the potential to carry biosecurity matter

containment action taken to prevent the spread of a weed or pest animal species beyond a predefined area

eradication the removal of all individuals of a weed or pest animal species from a defined area

established pest a weed or pest animal that is perpetuated, for the foreseeable future, within an area where it is not feasible (in terms of technical feasibility or a cost–benefit analysis) to eradicate the pest

general biosecurity obligation an overarching obligation that requires all people who deal with biosecurity matter or a carrier to take all reasonable and practical measures to minimise the risk associated with that biosecurity matter

incursion an isolated population of a pest recently detected in an area, not known to be established, but expected to survive for the immediate future

land manager an individual, company, organisation or government that owns, leases or manages private, commercial or government land

natural resource management (NRM) group an organisation that acts as a regional delivery agent (under the regional stream of the National Landcare Program and the Queensland Regional Natural Resource Management Investment Program) and focuses on on-ground activities that protect, improve and restore waterways and rangelands by managing weeds and pests, and improving soil, vegetation and water quality at a river-catchment or other landscape level

nil-tenure approach an approach in which a range of control methods are applied across all tenures by all stakeholders at a 'landscape' (rather than 'property') level in a cooperative and coordinated manner

pest animal an animal having, or with potential to have, an adverse environmental, economic, or social impact

predation the killing of one animal (prey) by another animal (predator) for food

prevention actions such as preborder risk assessments and quarantine that minimise the risk of a species entering an area

rabbit harbour an area where rabbits are likely to be found (e.g. around and under logs and rocks, under buildings, in dense, low-lying vegetation, in rubbish dumps)

remove eliminate from a place

risk creators individuals, organisations, industry groups etc. (excluding governments undertaking biosecurity activities as part of their regulatory responsibilities) who create situations that may result in a weed or pest animal species entering, emerging in, establishing in or spreading in an area, and in that species causing harm to the environment or economic or community activities

risk management the process of identifying risks and selecting and implementing measures to reduce levels of risk

sleeper population pest species that are in an early stage of population development (i.e. have formed a small population or populations) and whose range may be restricted for a variety of reasons (e.g. the absence of favourable environmental conditions) but if conditions change could spread and cause extensive damage to the natural environment and agriculture

weed a plant that requires some form of action to reduce its negative effects on the environment, the economy and human health and amenity

Weeds of National Significance (WONS) weeds that have been identified as among Australia's worst weeds and for which a nationally coordinated management strategy has been developed and implemented; see http://www.weeds.org.au/natsig.htm for more details

Abbreviations

CRC	Cooperative Research Centre
NRM	natural resource management
SCYC	South Cape York Catchments
WDBF	wild dog barrier fence
WONS	Weeds of National Significance

Introduction

Background

Queensland has many plants and animals that have been introduced, either deliberately or accidentally. Some of these species have become invasive—that is, they have spread and multiplied to the point where they can cause damage to the environment, the economy and the community, including human health and recreation.

Queensland's environmental diversity and climatic conditions favour the establishment of many exotic pests. To cope with this relatively high level of threat, the state needs flexible and responsive laws. The *Biosecurity Act 2014* (the Biosecurity Act) was passed by Queensland Parliament in March 2014 and will come into force by 1 July 2016. This new Act will improve Queensland's biosecurity preparedness and response capabilities. Decisions made under the Biosecurity Act will depend on the likelihood and consequence of the risk, and this will result in risks being managed more appropriately.

Under the Biosecurity Act, everyone has an obligation to manage and prevent biosecurity risks from weeds, pest animals and other biosecurity matter. This **general biosecurity obligation** means everyone must take all reasonable steps to ensure they do not spread a weed, pest animal, disease or contaminant.

The objectives of managing invasive species are to prevent new introductions and to minimise negative impacts of these species on the environment, the economy and the community.

New and recent incursions

New introductions and outbreaks of pest species continue to occur throughout Queensland. These are usually via pathways such as the illegal pet trade or via 'hitchhiking' on equipment, cargo, fodder, cattle or other transport. Occasionally new incursions occur when species are deliberately introduced by land managers (for a real or perceived use) but later develop into problems for other land managers, the environment or the community.

In 2013, the Weed Spotters' Network Queensland provided 92 notifications for weed species that were found for the first time or had expanded their range.

Between 2011 and 2014, there were more than 20 pest animal incursions in Queensland. These included ferrets, boa constrictors, American corn snakes, a saw-scaled viper, red-eared slider turtles and a Chinese stripe-necked turtle. These species have been removed and are not known to be present now (Queensland Government 2014).

Impacts

Weeds and pest animals have the potential to adversely alter ecosystem function, reduce primary industry productivity and profitability, and threaten human and animal health and social amenity.

Environmental impacts

Introduced pest species place considerable pressure on native biodiversity, either directly or by affecting vegetation structure and/or ecological and physical processes. This can lead to the reduction or extinction of native species.

The negative impacts of pest animals on biodiversity include:

- direct predation
- loss of food and shelter for native species
- degradation of habitats
- reduction and possible extinction of native animals
- spread of disease
- competition for shelter and food
- loss of genetic purity (hybridisation).

Foxes and feral cats have been implicated in the decline or possible local extinction of at least 17 native species listed as threatened or vulnerable. Many other species are also thought to be at risk from these predators.

Rabbits, feral goats and feral pigs prevent the regeneration of, and destroy, plant species that provide food and/or shelter to native species. They also compete directly with native species for food. Red-eared slider turtles outcompete native turtles for space in waterways.

Carp reduce water quality, feral pigs introduce weed seeds and rabbits initiate and accelerate land degradation.

The decline of native predators such as quolls and monitors has been attributed to poisoning from cane toads. The genetic purity of dingoes is being lost as they breed with wild dogs.

Pest animals can spread exotic, new or emerging animal and human diseases. The trade in aquarium fish may be the source of exotic diseases that have been implicated in the decline of some native frog species. These diseases could also affect native fish populations.

The negative impacts of weeds on biodiversity include:

- degradation of native vegetation
- loss of food and shelter for native species
- reduction and possible extinction of native species.

Weeds degrade natural vegetation and impact on biodiversity generally. For example, rubber vine has the potential to completely destroy all deciduous vine thickets in northern Queensland, which would lead to the loss of entire unique ecosystems and the extinction of many plant and animal species. High biomass grasses can also lead to changed fire frequency and intensity, resulting in irreversible changes to vegetation structure.

Economic impacts

According to the Invasive Animals Cooperative Research Centre (CRC), the direct annual economic impact from pest animals on Australia is $743 million (Gong et al. 2009). The impacts of some animals in Queensland are well documented; however, the true cost of pest animals to Queensland's economy is unknown and difficult to quantify. Based on the above report, it is conservatively estimated that pest animals cost Queensland $215 million a year by preying on livestock, causing crop losses, competing for pasture and spreading disease.

It is estimated that feral pigs alone have reduced grain production by $12 million a year.

The production impacts of wild dogs on rural industries in Queensland have been estimated at $33 million a year—this includes livestock losses, spread of disease and control (Rural Management Partners 2004). Gong et al. (2009) have estimated that the annual economic surplus losses in the

Queensland beef, lamb and wool industries due to wild dogs is $22.28 million, while AgForce (2009) has estimated the annual costs attributed to wild dogs may be as high as $67 million (based on producer estimates of production loss and processor figures of discounted dog-bitten animals).

The cost of each mouse plague is estimated at between $10 million and $20 million in lost agricultural production and $1.5 million in control by land managers and government.

The negative economic impacts of pest animals include:

- direct control and management costs
- predation of livestock (by wild dogs, foxes and feral pigs)
- competition for resources
- destruction of natural resources through soil disturbance and removal of vegetation
- destruction of pastures and crops
- creation of general nuisance in urban and rural residential areas and associated management
- reduction of nature-based tourism due to destruction of natural resources.

Weeds are also a significant problem for agricultural land users. The CRC for Australian Weed Management estimated that impacts of invasive terrestrial weeds on agriculture cost the Australian economy approximately $4 billion per year (Sinden et al. 2004). As Queensland is Australia's second largest state and has the highest proportion of land area in any state dedicated to agriculture, the costs associated with lost production and weed control in Queensland are considerable.

The negative economic impacts of weeds include:

- competition with pastures leading to reduced stocking capacity and erosion
- toxicity to stock
- competition with crops for water and nutrients
- increased stock mustering costs
- loss of ecotourism values
- impacts (of aquatic weeds) on water quality and irrigation
- management costs arising from the use of physical, mechanical and chemical control methods
- increased cost of fire preparedness and response due to spread of high biomass grasses.

Just five declared weeds—parthenium weed (*Parthenium hysterophorus*), rubber vine (*Cryptostegia grandiflora*), prickly acacia (*Acacia nilotica*), mesquite (*Prosopis* spp.) and parkinsonia (*Parkinsonia aculeata*)—cost Queensland more than $50 million each year in lost production and control costs.

The cost of reduced production in the Mulga lands of south-western Queensland, caused by the intrusion of woody weeds and the ensuing erosion, is estimated at over $50 million each year.

The estimated annual cost of weeds in winter crops in southern Queensland alone is $40 million.

A report submitted by PricewaterhouseCoopers to the Department of Agriculture and Fisheries conservatively estimated the cost to Queensland from weeds and pest animals will escalate to $1.1 billion each year if impacts are not mitigated. This included $380 million from established pest animals including wild dogs and feral pigs, $227 million from established weeds such as prickly acacia and parthenium weed, and $194 million from water weeds such as water hyacinth (*Eichhornia crassipes*) and salvinia (*Salvinia molesta*).

Social and human health impacts

Sometimes weeds and pest animals affect liveability, particularly in urban and rural residential areas. They can cause general nuisance and disturbance and reduce the community's enjoyment of natural areas.

The negative impacts of pest animals on social and human health include:

- predation of livestock and pets
- increased risk of motor vehicle accidents
- damage to structures
- spread of disease.

Wild dogs and foxes prey on family pets and poultry, feral deer and horses cause motor vehicle accidents, rabbits undermine cemeteries and infrastructure and hares chew irrigation lines.

Feral animals can carry zoonotic diseases such as hydatids (wild dogs and foxes), Q fever (feral pigs), brucellosis (feral pigs) and leptospirosis (feral pigs, feral deer).

The negative impacts of weeds on social and human health include:

- allergic reactions
- increased risks and reduced aesthetic value in recreational areas
- increased risk of fire.

Parthenium weed has a significant impact on human health in the heavily infested Central Highlands areas of Queensland. People can suffer serious allergic reactions—such as dermatitis, rhinitis and asthma—on contact with the plant or its pollen.

Many aquatic weeds, such as salvinia, cause safety hazards. Small children have drowned when they thought the floating 'carpet' of salvinia was solid. Aquatic weeds also interfere with recreational activities (such as swimming and canoeing), and reduce the aesthetic value of lakes and streams.

High biomass grasses, such as gamba grass (*Andropogon gayanus*), can lead to changed fire frequency and intensity with associated risks to the community.

Control programs

Queensland has a number of current control programs aiming at statewide or local eradication of specific species. The programs are at varying stages, such as development of an eradication plan (early stage) and ongoing monitoring of sites to confirm proof of freedom (later stage). Some examples of these programs follow.

Red-eared slider turtle eradication

The first naturalised population of red-eared sliders was detected in Queensland in 2004 in a small number of private dams just north of Brisbane. Response efforts initially aimed to locate the source and define the extent of the incursion. This, combined with a public awareness campaign, resulted in the detection of an illegal breeding facility and two other naturalised populations. A small number of specimens being kept as pets were relinquished to authorities.

An eradication campaign focused on three sites covering a total area of about 125 hectares. This program continued for more than 8 years. It included trapping and netting turtles and using a sniffer dog that was trained to detect eggs, egg products and the turtles themselves. This reduced populations to very low levels, evidenced in the marked decline in capture rate (from 140 animals in 2004 to just 2 in 2009). Further efforts then focused on detecting the very small numbers of remaining wild specimens and preventing release/dumping of additional animals. The eradication of known populations appears to have been successful.

New DNA probe technology developed as a result of the project could reduce the cost of future eradication/management programs substantially, perhaps by a factor of 10.

Because of the high risk associated with continued dumping of unwanted pets, surveillance and control is ongoing. Surveillance platforms have been deployed in dams where the turtles were previously detected. The platforms are designed to passively monitor turtle species present in the dams using remote cameras. They are baited to attract turtles, which can then bask on the platforms. Motion-detection cameras photograph the turtles to enable species identification.

National Four Tropical Weeds Eradication Program

This program commenced in 2003 and is targeting four species of tropical weeds for eradication—Koster's curse, limnocharis, mikania vine and miconia. These are predominantly located on the wet tropics coast of Queensland. The nationally coordinated program is managed and operated by Biosecurity Queensland and involves extensive community engagement (to identify infested areas), targeted weed surveys and weed control and research components.

The program has continued to make good progress towards eradication of all four species. The first full year of a scaled-up program (2012–13) led to a 62% increase in field surveillance. The field teams completed over 3000 hectares of on-ground surveillance, mostly in rugged terrain and cyclone-damaged rainforests. The program has continued to receive strong stakeholder support from regional partners in Queensland and New South Wales, with in-kind resources valued at more than $647 000 provided for operations, community engagement and research.

Purpose

The purpose of this strategy is to establish a statewide planning framework that will address the environmental, economic and social impacts of Queensland's current and potential weeds and pest animals.

Previously Queensland maintained separate strategies for weeds and pest animals. The 2002–2006 pest animal strategy and weeds strategy were developed following extensive consultation with stakeholders and had a number of features in common. This revision combines the strategies to give a coordinated approach to the management of pest species.

This strategy sets out the key principles of weed and pest animal management and desired outcomes for Queensland. It aims to clarify roles and responsibilities of those involved in weed and pest animal management (including local governments, land managers, industry and the community) and help them improve consistency in implementing best practice and more efficiently use resources.

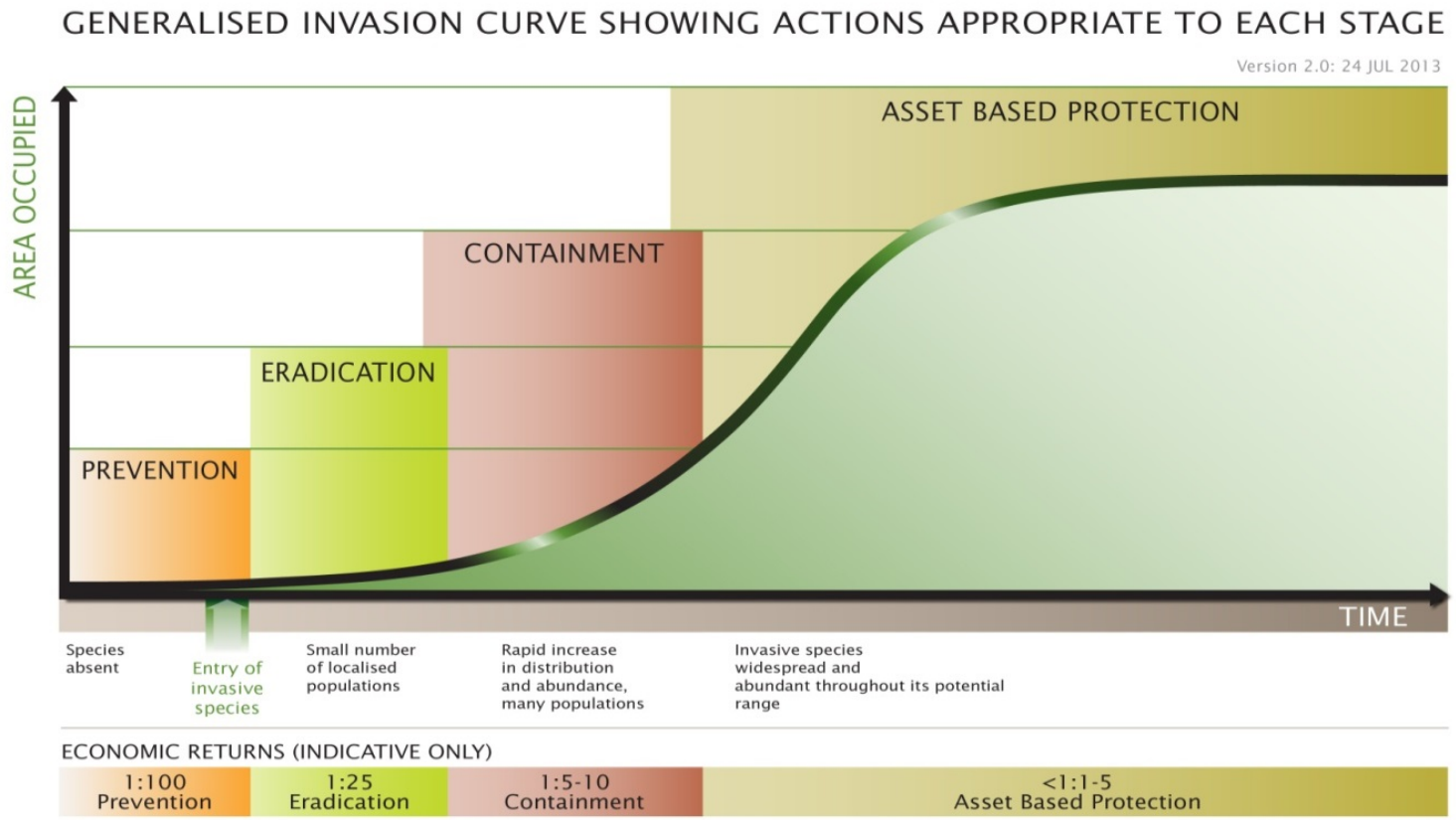
Scope

This strategy encompasses all exotic weeds and pest animals. It does not include overabundant native species, marine pests or crop weeds.

Context

The management of invasive plants and animals needs to be considered in the context of the full spectrum or continuum of activity essential for the effective management of biosecurity—that is, the management of the impacts of invasive plants and animals on the environment, the economy and the community.

The continuum is represented in the following generalised invasion curve.



Key stages influencing the invasion curve are:

- prevention of an incursion (including planning and preparedness)
- eradication of an incursion (usually requiring early detection)
- containment of an incursion (to a geographical area)
- protection of assets (from impacts once an invasive plant or animal is established).

The approach needed to eradicate a new invasive plant or animal is very different from that required to protect assets from the impacts of an established weed (e.g. a WONS) or an established invasive animal. Managing an established invasive plant or animal is about mitigating impacts on assets, as eliminating the invasive plant or animal may not be feasible.

The role of government and other stakeholders also changes along the invasion curve, together with the necessary actions and who is best placed to carry them out. The return on investment of public funds generally reduces when progressing along the invasion curve. For example, governments have a greater responsibility in the earlier stages of prevention and eradication, whereas those best placed to protect assets at risk (public or private) are generally the owners of those assets, which may or may not be governments. Decisions on whether and how to manage impacts of an established invasive plant or animal on private assets (such as land, crops or livestock) are often best made at a property, enterprise or local level and actions should be prioritised based on risk management.

The management of weeds and pest animals requires planning and coordination at national, state, regional, local and property levels. This strategy is therefore supported and underpinned by:

- the Intergovernmental Agreement on Biosecurity
- Queensland legislative provisions
- Queensland Government's policy for agriculture
- Queensland Government's policy for biosecurity
- *Australian pest animal strategy*
- *The Australian weeds strategy*.[1]

Also, it drives and guides the development of:

- regional weed and pest animal management and biosecurity plans
- local government weed and pest animal management plans
- national parks weed and pest animal management plans
- property weed and pest animal management plans
- individual pest species strategies.

Development

The 2002–2006 strategies were developed through extensive consultation with stakeholders representing industry, the community and the state government. They were effective in guiding management actions by the various stakeholder groups. This coordinated guidance led to numerous successes for Queensland, some of which are discussed on the following page.

[1] *Australian pest animal strategy* and *The Australian weeds strategy* are currently under review. Drafts of these documents are expected to be released for consultation in early 2016.

Case study: Cape York salvinia eradication success

In 2013 a dedicated group of weed managers from Lakeland Downs received statewide recognition for pulling off the remarkable feat of removing salvinia, one of Australia's worst weeds, from more than 240 hectares of water supply and 9 kilometres of waterway in southern Cape York. The group's efforts will protect the economically important irrigation water supply of Honey Dam. Their actions almost certainly also saved Rinyirru (Lakefield) National Park—one of our most iconic wetland areas and a favourite barramundi fishing haunt—from this noxious floating pest.

South Cape York Catchments (SCYC) received the prestigious George N. Batianoff award for team excellence in weed management on behalf of landholders, schoolchildren who set up a salvinia weevil breeding program in their school as part of the Salvinia Weed Warriors program and colleagues who delivered the project, which has been in progress since 2008.

All indications are that the eradication program has been successful, so this is possibly the largest infestation of salvinia ever eradicated in Australia. Salvinia is a floating water weed that is widespread in many east coast catchments. It regularly flares up in water impoundments, smothering native vegetation, blocking creeks and choking out fish and other wildlife. The remarkable feat of removing hundreds of thousands of individual plants was brought about by a combination of herbicide, biological control using weevils, manual removal and, above all, hawk-eyed vigilance from a dedicated team.

SCYC will continue actively monitoring the expansive site and keeping an eye on the rest on of the Cape for signs of salvinia for years to come.

Case study: Mexican feather grass eradication

In 2008, Mexican feather grass was mislabelled and sold through Queensland nursery and landscape outlets. Landscapers planted the grass in gardens and other areas as part of landscaping projects. Biosecurity Queensland instigated an emergency response in November 2008 following the discovery of four Mexican feather grass plants in a footpath garden in the Brisbane suburb of Bulimba. A number of activities were consequently undertaken to eradicate the pest plant.

Mexican feather grass plants were recovered from nurseries, landscapers and private gardens. The challenge was then to trace plants that were sold by retail outlets. Many people responded through the department’s customer service centre, and this helped trace some of the plants.

Mexican feather grass was found planted or present on 50 properties. Owners and occupiers of these sites were provided with an information pack and advice on the eradication program. All 50 sites were subject to a risk assessment and were decontaminated to remove as much seed as possible. Properties were placed under emergency quarantine with conditions that were not too onerous and were then regularly monitored.

The public's help was required to locate and retrieve any remaining plants, so a targeted community engagement and awareness campaign involving local media and letterbox drops was implemented. Scout groups and Australia Post assisted in delivering leaflets to residences and businesses in central and southern Queensland regions including Emerald, Kingaroy, Biloela, Thangool and Goondiwindi. Biosecurity officers were also on hand at a number of regional shows and events with information on the grass, hoping to spark some further reports of the plants.

No additional reports were made. However, wet conditions following the eradication program have reduced both the chance of remaining plants surviving and the possibility of recurrence.

A review of the eradication program in 2010–11 found 92% of decontaminated properties had a low or very low level of risk of recurrence or spread of the grass. The quarantine on those properties was lifted, but quarantine and surveillance for the remaining properties was to be maintained until their risk of spread or recurrence dropped to low. At the time of the review, this additional period was expected to be short (O’Keefe & Whyte 2011).

There is a very high probability that Mexican feather grass was successfully eradicated as a result of this response. There have been no reports of the grass since 2010 and monitoring has not detected any plants in Queensland.

A review of the strategies was finalised in 2008. The review included the results of a statewide survey and a survey of Department of Natural Resources and Water staff as well as State of the Environment reporting from 1999, 2003 and 2007. It also used data from assessments, surveys, questionnaires and focus group discussions involving key stakeholders including local government, regional natural resource management (NRM) bodies and other state government agencies.

Key findings of the review were:

- The strategies were largely consistent with international, national and state directions.
- State agencies, local governments and regional NRM bodies have included elements of the strategies in their weed and pest animal management plans.
- Local governments have developed local government area weed and pest animal management plans that are consistent with the state strategies as required.
- Major changes to the strategies could impose significant costs on local governments, as they are required to review their management plans following a review of the state strategies.
- Surveys and questionnaires confirmed community awareness about weed and pest animal issues.
- Over 85% of the actions in the strategies have been implemented in full or in part.
- There were limited responsibilities for any organisation to promote and 'drive' the implementation of the strategies.
- There were some issues in coordinating implementation of the two strategies; however, no major deficiencies were identified in content or provisions and therefore recommended changes were relatively minor.

Combination of the strategies

A well-defined strategy is needed to guide policy, inform stakeholders and provide for coordination of the multifaceted approach required for effective management of pest species.

This combined and revised strategy builds on the original strategies. It incorporates recommendations of the 2008 review and is consistent with drafts of the new national weed and pest animal strategies (currently under review). It includes:

- input into development of a nationally agreed process to identify and prioritise key assets under threat from pest animals (participation in national process)
- input into development of management plans for weeds and pest animals of national significance
- procedures for implementing, monitoring and evaluating the effectiveness of management plans.

The combined strategy also aims to reduce the burden of red tape. This is in keeping with the principles of the new Biosecurity Act, which provides greater flexibility for people to manage the risks associated with weeds and pest animals in the most reasonable and practical way for their situation.

A meeting on the future of feral animal management in Queensland, held in June 2013, was attended by representatives from over 50 organisations. This collaborative consultation produced many suggestions for improved management of feral animals in Queensland. These suggestions have been collated and, where appropriate and feasible, incorporated into this strategy.

Specific weed and pest animal management outcomes and actions are provided in Appendix 1.

Principles and best practice

The development and implementation of this strategy is based on the management principles for weeds and pest animals shown below. The principles provide a common basis for management throughout Queensland and align with those in the draft Australian strategies. The consideration of all these principles is critical to the success of any management activity, regardless of scope and scale.

Management principles

Management principle	Comments
Integration	Weed and pest animal management is an integral part of managing natural resources and agricultural systems.
Public awareness	Public awareness and knowledge of weeds and pest animals must be raised to increase the capacity and willingness of individuals to participate in control.
Commitment	Effective weed and pest animal management requires shared responsibility, capability, capacity and a long-term commitment by land owners/managers, the community, industry groups and government. Those that create the risks associated with pest species introduction or spread and those that benefit from the pest management should help to minimise the impacts of weeds and pest animals and contribute to the costs of management.
Consultation and partnership	Consultation and partnership arrangements between land managers, local communities, industry groups, state government agencies and local governments must be established to achieve a collaborative and coordinated approach to management.
Planning	Planning for weed and pest animal management should be based on risk management to ensure that resources target the priorities identified at local, regional, state and national levels.
Prevention and early intervention	Preventive weed and pest animal management is generally more cost-effective than other strategies and is achieved by: - preventing the spread of pest species and viable parts of these species, especially by human activity - early detection and intervention.
Best practice	Weed and pest animal management must be based on ecologically and socially responsible practices that protect the environment and the productive capacity of natural resources while minimising impacts on the community. It should balance feasibility, cost-effectiveness, sustainability, humaneness, community perceptions, emergency needs and public safety.
Improvement (research, monitoring and evaluation)	Research about weeds and pest animals and regular monitoring and evaluation of control activities is needed to make evidence-based decisions and improve management practices.

Humaneness of feral animal control

The *Animal Care and Protection Act 2001* provides for the control of pest animals only when the control is done in a way that causes the animal as little pain as is reasonable.

Model codes of practice (codes) and standard operating procedures for the humane control of various feral animals are available from PestSmart Connect (www.pestsmart.org.au). They provide guidance on humane control and promote the importance of ensuring control efforts are effective and targeted.

Humaneness assessments for control methods are also available for a number of species.

The codes evaluate the humaneness of different control methods.

- Exclusion fencing is generally regarded as a humane, non-lethal alternative to lethal control methods.
- The use of guardian animals is also seen as a humane alternative or adjunct to conventional lethal wild dog control. Owners must ensure guardian animals are well cared for.
- The humanness of baiting using poisons such as 1080 and strychnine is not yet fully understood. It is thought that during the initial onset of signs of 1080 poisoning the animal is likely to be conscious and possibly suffering distress and pain. However, during the latter stages, when the animal shows signs of central nervous system dysfunction, it may not be suffering. Poisoning from strychnine is considered less humane than poisoning from 1080 because the affected animals remain conscious and appear to suffer pain and anxiety from the onset of clinical signs through to death.
- Shooting can be a humane method when it is carried out by experienced, skilled and responsible shooters. Wounded animals must be located and dispatched as quickly and humanely as possible. If lactating females are shot, efforts should be made to find dependent pups and kill them quickly and humanely.
- Trapping can cause pain and distress. However, there are ways of increasing animal welfare outcomes during trapping, such as matching trap size to foot size and using padded or rubber jaw inserts or offset jaws. Traps should be set in areas that are protected from environmental extremes and should be checked regularly. Traps set in the evening should be checked the next morning or through monitoring systems. Strychnine should be used on the jaws of leg-hold traps to expedite the death of trapped dogs in remote areas where it is impossible to check traps daily. These traps should be checked as regularly as possible.

Euthanasia is the humane destruction of an animal by a method that produces rapid unconsciousness and subsequent death without evidence of pain or distress. This concept should be remembered when using any method to destroy pest animals, either directly or indirectly.

When choosing a control technique, always consider the effectiveness of the technique, its humaneness and public safety.

The primary responsibility for management of weeds and pest animals rests with the land manager, but collective action using a nil-tenure approach is best practice, particularly for mobile species.

Good neighbour policy

Land managers have an obligation to manage pest species that are present on the land they are responsible for. However, they also have an obligation regarding their neighbours' land.

A 'good neighbour policy' is a local government policy about the enforcement of a land manager's pest control obligations. It applies where there is evidence that a pest species present on a property will spread to adjacent or nearby land (neighbours' land) if the land manager does not take (at least) the minimum action required to manage the pest species on their land.

The purpose of such a policy is to manage the spread of declared pests, and in particular to prevent adverse effects and/or unreasonable costs to all land managers. The policy identifies the action expected from land managers to sufficiently manage specific pest species on their land.

Strategic plan

Vision

Weed and pest animal impacts on the environment, the economy and the community are cooperatively managed.

Mission

To establish and perpetuate effective cooperative management of the impacts of Queensland's weeds and pest animals.

Desired outcomes, objectives and actions

Six desired outcomes and related objectives have been developed to achieve the vision and to provide the means for undertaking the mission:

Outcomes and objectives

Outcome	Objective
Prevention and early intervention	Establishment and spread of weeds and pest animals are prevented.
Monitoring and assessment	Reliable information is the basis for decision-making.
Awareness and education	Stakeholders are informed and knowledgeable, with the capability and capacity to take ownership of weed and pest animal management.
Effective management systems	Integrated systems for successfully managing and reducing/minimising the impacts of weeds and pest animals are developed and widely implemented through risk management.
Strategic planning framework and management	Strategic directions are developed and maintained, with an acceptable level of stakeholder ownership, and are informed by risk management.
Commitment, roles and responsibilities	Management of weeds and pest animals is the shared responsibility of land managers, industry, the community and all levels of government. All stakeholders are committed to, and undertake, coordinated management. The cost of this management is borne by the risk creators and those who benefit from the management.

Each outcome is accompanied by a set of strategic actions that need to be implemented to achieve the specified objective.

Prevention and early intervention

Objective: Establishment and spread of weeds and pest animals is prevented.

Prevention and early intervention is generally the most cost-effective management strategy. Once a pest species is introduced and becomes established, it is often very difficult or even impossible to eradicate and costly to control. Government generally has a greater involvement in the earlier stages of prevention and eradication, but all community members have a role in preventing the introduction and spread of weeds and pest animals into and around the state.

Weeds and pest animals present different levels of risk and hazard in different regions and productive systems. Determining risk and hazard is essential in defining priorities for prevention and management. Preventing the expansion of current weed and pest animal distributions and populations will greatly reduce the risk of further negative impacts.

Prevention and early intervention – actions

Actions
• Cooperate with other states and territories to develop consistent or complementary legislation, policies and strategies that are based on sound research and risk analysis on the keeping and introduction of exotic weeds and pest animals.
• Contribute to national policies to minimise the risk of the introduction of new species with significant pest potential.
• Prevent the entry of species with high pest potential in collaboration with the federal government's preborder activities.
• Ensure species that may be kept by permit are securely held.
• Promote public and industry awareness of and support for prevention. Improve community awareness of the risk posed by exotic animals and plants.
• Establish and maintain close working relationships between agencies that report newly introduced weeds and pest animals.
• Contribute to the development of national weed and pest animal response plans, including an agreement on cost-sharing for new incursions.
• Promote federal and state administrative procedures for trade and permit conditions for current and potential weeds and pest animals.
• Enforce legislative provisions for the control of the keeping of potential weeds and pest animals.
• Carry out research and risk analysis on potential new incursions and use this information pre-emptively.
• Establish communications and community engagement processes that provide timely information through a range of channels.
• Eradicate new incursions of identified high-risk species as outlined in government and industry agreements.
• Assess sleeper populations and eradicate or contain them as appropriate.
• Through education and enforcement, continue to use containment and exclusion to prevent the spread of weeds and pest animals to new areas.
• Control and reduce the population of weeds and pest animals around containment areas.
• Establish an awareness campaign aimed at preventing the human-assisted spread of weeds

Actions
and pest animals. • Use enforcement only if necessary. • Ensure contingency plans are a condition placed on permits to keep potential weeds and pest animals.

Monitoring and assessment

Objective: Reliable information is the basis for decision-making.

Reliable data is needed to ensure that weeds and pest animals are managed holistically and for the long term. Weed and pest animal control requires an appropriate balance between prevention, surveillance and preparedness. An increasing amount of information is available on the distribution, abundance and impact of pests. However, there is scope to increase coordination of this information and make better use of existing and new technologies for decision-making.

Monitoring and assessment – actions

Actions
• Integrate monitoring systems appropriate for collecting data about all weeds and pest animals across Queensland. This will include the work of other jurisdictions, groups and institutions. • Use standardised protocols for data collection, validation and dissemination, and use information collected by individuals and informal groups. • Promote a collaborative program for the collection of data on distribution, abundance, impacts and management status. • Develop and establish monitoring and reporting programs for all significant weed and pest animal management activities (see Appendixes 1 and 2). • Develop better understanding of the biology and ecology of priority weeds and pest animals through targeted and coordinated research programs. • Quantify the impacts of priority weeds and pest animals on economic activities, natural ecosystems, and human and animal health. • Model the populations of weeds and pest animals to better inform prediction of impacts. • Research and model the impact of climate change on the habitat and distribution of weeds and pest animals and use this information pre-emptively. • Quantify the impact of significant weeds and pest animals, determine acceptable levels of impact, and develop mitigation strategies to reduce current risks to acceptable levels. • Prioritise needs for research on weeds and pest animals, including potential pest species and ‘new’ situations for ‘old’ pest species. • Undertake regular reviews and objective, transparent risk analysis of priority weeds and pest animals in Queensland to assess progress and determine future needs. • Determine the total costs of individual weeds and pest animals (environmental, economic and social) and use these as a basis for prioritisation. • Develop and promote effective systems that prioritise weeds and pest animals requiring management (including priority areas for management) and can be used at all levels (local, regional and state).

Awareness and education

Objective: Stakeholders are informed and knowledgeable, with the capacity to take ownership of weed and pest animal management.

Effective management of weeds and pest animals relies on broad stakeholder knowledge of the problem and the management issues. Often people are not aware of the impacts that weeds and pest animals have on the natural environment or primary production, or that their own actions may be contributing to the problem. Many weed and pest animal problems are increased through lack of community knowledge and awareness. For example, people often do not realise that they act as vectors for spreading weeds and pest animals by allowing domestic dogs to breed with wild dogs, releasing domestic deer or spreading weed seeds.

The level of education on weeds and pest animals is increasing, but more targeted public education and a higher public profile are needed. Different stakeholders require different information and support to raise their awareness and their willingness to help manage weeds and pest animals. Increased industry support for weed and pest animal management is one possible approach to increasing awareness of land managers.

Overall community awareness will improve when stakeholders have accessible, science-based information on weeds and pest animals, their characteristics, their impacts and control actions. This awareness is needed to ensure ongoing public support for weed and pest animal management and research. Building this knowledge within the community will also enable people to take ownership of the issue, increase their confidence and make them more likely to act.

Awareness and education – actions

Actions
• Develop, implement and regularly review weed and pest animal information programs. Use current and varied communications technologies to regularly provide up-to-date information to all sections of the community. • Develop weed and pest animal awareness programs based on sound social research to support better decision-making, risk management and community action. • Encourage public support for weed and pest animal management activities through awareness programs, particularly with peri-urban land managers. • Improve formal and informal communication networks at all levels; this includes supporting community-focused NRM programs. • Publicise the impacts of weeds and pest animals. • Publicise the positive results to the environment, the economy and the community from appropriate management of weeds and pest animals. • Provide warnings where human activities create favourable conditions for weeds and pest animals. • Establish links and programs to raise awareness of weeds and pest animals, change management practices and promote integrated property management. • Assess community and individual attitudes to garden plants and pets as weeds and pest animals. • Determine what makes people change their pest management practices. • Investigate options to promote compliance. • Develop weed and pest animal content for schools, and provide project kits where appropriate. • Display educational material at relevant locations. • Review the national qualification framework and ensure new competencies are developed to meet Queensland's future needs in weed and pest animal science and sustainable development. • Promote and facilitate high-quality specific training for individuals involved in weed and pest animal management and sustainable land management so they meet national competencies as well as regional and organisational requirements.

Effective management systems

Objective: Integrated systems for successfully managing and reducing/minimising the impacts of weeds and pest animals are developed and widely implemented through risk assessment.

It is widely accepted that integrated pest management systems are the most effective. That is, best practice for effective control of pest species often involves multiple control methods, and successful long-term management of weeds and pest animals relies on cooperation with neighbours and the coordination of control activities.

To ensure the best possible outcomes, all stakeholders should advocate and adopt best practice management for all weed and pest animal management activities. Weed and pest animal management legislation is backed by suitable enforcement measures, but enforcement should only be used when other approaches have failed.

Effective management – actions

Actions
• Investigate additional, improved and alternative methods of control. • Develop, maintain and distribute documentation on best practice. • Prepare and promote decision-support systems to help land managers identify opportunities for effective and efficient control of weeds and pest animals. • Integrate weed and pest animal management into good land-use and property-management practices. • Apply adaptive management approaches to enhance uptake and refine management strategies through partnerships between land managers, government, industry and not-for-profit organisations. • Develop weed and pest animal benchmarks to help assess the adoption of best practice. • Discourage actions that contribute to or maintain weed and pest animal impacts in and around urban areas. • Ensure that quality information, training and administrative systems are available for biosecurity responses and that these can be mobilised effectively as needed. • Implement effective community-based control programs. • Include land managers in the leadership, coordination and implementation of control programs. • Contribute to a nationally agreed process to identify and prioritise key assets under threat from weeds and pest animals. • Develop and implement site-based approaches to managing weeds and pest animals that threaten key assets. • Implement strategic habitat manipulation, consistent with sustainable land management practices (including in the built environment) and conservation plans, to restrict weed and pest animal population growth. • Predict major population fluctuations and identify opportunities for strategic preventive control programs. • Reduce weed and pest animal populations inside exclusion barriers. • Schedule management activities to coincide with natural population fluctuations and seasonal conditions. • Promote education, incentives and persuasion as alternatives to enforcement. • Establish stakeholder-supported compliance and enforcement systems. • Develop enforcement strategies and procedures that are linked to agreed levels of impact. • Identify and allocate the resources necessary to enable enforcement. • Train authorised officers to enforce the legislative provisions for weed and pest animal management. • Establish a support network for enforcement officers. • Conduct a regular review of enforcement activities.

Strategic planning framework and management

Objective: Strategic directions are developed and maintained, with an acceptable level of stakeholder ownership, and are informed by risk management.

Community and industry leadership in the planning and development of strategies is key to maximising the benefits of weed and pest animal management. A system of setting priorities for this management is critical to ensuring that resources are used as efficiently as possible.

A strategic approach can only achieve common goals and priorities if there is effective communication and cooperation between land managers, NRM groups, industry, local governments and state government departments. Local government weed and pest animal management plans offer a 'partnership' mechanism to achieve this level of coordination and efficiency, and the Biosecurity Act facilitates a risk-based approach to weed and pest animal management.

Strategic planning – actions

Actions
• Develop, implement and review weed and pest animal management plans for all local government areas, ensuring that the plans are supported by the community, the state government, land managers and NRM groups. • Develop weed and pest animal components within property and industry biosecurity management plans. • Develop individual and/or multi-species weed and pest animal management plans. • Develop and implement weed and pest animal management plans for state-managed lands that complement local government plans. • Ensure the above plans are consistent with nationally recognised codes of practice. • Contribute to the formulation of nationally consistent codes of practice and management plans. • Identify, analyse, develop, strengthen and maintain existing stakeholder links used to deal with weed and pest animal management. Use gap analysis to identify areas where more links are needed. • Ensure any proposed weed or pest animal management project considers relevant native title implications.

Commitment, roles and responsibilities

Objective: Management of weeds and pest animals is the shared responsibility of land managers, industry, the community and all levels of government. All stakeholders are committed to, and undertake, coordinated pest management. The cost of this management is borne by the risk creators and those who benefit from the management.

Clearly defined and accepted roles and responsibilities are crucial to the success of long-term management. There is often a degree of confusion within the community about the exact responsibilities of land managers, local government and state government in weed and pest animal management, and this must be addressed.

When planning and implementing weed and pest animal management programs, stakeholders should recognise each other's capacity to deliver the desired outcomes. The broad scope and nature of weed and pest animal problems demands a long-term commitment by all stakeholders; they need to recognise the effort, time and cost required for effective management. Local government planning is crucial to the success of weed and pest animal management and provides an opportunity to foster community commitment to roles and responsibilities.

State-managed lands are often perceived to be sources of and sinks for weeds and pest animals. State government agencies have a responsibility to manage weeds and pest animals on lands and water bodies under their control. Land managers, local governments and community groups often call for greater resources to be allocated to weed and pest animal management on state-managed lands; however, analysis shows that control activities on many of these are at a significantly higher level than on surrounding privately owned lands. Community and local government planning must include all stakeholders, including managers of state land, early in the planning process.

Commitment, roles and responsibilities – actions

Actions
• Build ownership of and capacity for weed and pest animal management through long-term partnerships between the community, industry and all levels of government.
• Encourage all land managers, including government, to use a nil-tenure approach to weed and pest animal management and to land management that has implications for weed and pest animal management.
• Use the local government planning process to foster community engagement.
• Establish and document roles and responsibilities for weed and pest animal management.
• Promote the roles and responsibilities of all stakeholders.
• Use existing community networks to help establish roles and responsibilities and to inform stakeholders of these.
• Establish mechanisms to attract, direct and acknowledge the efforts of community volunteers.
• Identify common objectives and opportunities for sharing of resources.
• Support the development of long-term weed and pest animal management projects that are resourced by the community and industry.
• Identify and capitalise on opportunities for obtaining resources from sponsors, government programs and industry.
• Establish mechanisms to ensure that beneficiaries of weed and pest animal management contribute to its delivery.
• Allocate resources for weed and pest animal management according to agreed priorities.
• Foster weed and pest animal management as a duty of care for land managers (see Appendixes 1 and 2).
• Promote weed and pest animal management as a long-term investment by land managers in the economic and ecological viability of their properties.

Stakeholder roles and responsibilities

Australian Government

- Provide the framework for weed and pest animal management in Australia.
- Coordinate, facilitate and promote national weed and pest animal management policies and programs.
- Provide leadership and coordination for emergency responses to weeds and pest animals of national significance.

Queensland Government

Biosecurity Queensland

- Develop and implement weed and pest animal management policy through legislation, research and extension education programs.
- Coordinate state responses to weeds and pest animals.
- Guide, encourage and assist local governments, regional NRM groups, land holders and land managers in weed and pest animal management.

Other Queensland Government agencies

- Manage weeds and pest animals on state-managed land and waterways in accordance with agreed local/regional priorities.

Local Government

- Develop and enforce local government area weed and pest animal management plans and/or biosecurity plans.
- Guide, encourage and assist regional NRM groups, community groups, land holders and land managers in weed and pest animal management.
- Coordinate community weed and pest animal management programs.
- Manage weeds and pest animals on land controlled by local government in accordance with agreed local/regional priorities.

Land managers (public and private)

- Follow best practice for weed and pest animal management on land they have responsibility for in line with relevant legislation, policy, guidelines, management plans and codes of practice.

Community groups

- Promote awareness of weed and pest animal issues within the wider community.

Industry organisations

- Promote and facilitate weed and pest animal management on agreed local/regional priorities.
- Identify and fund research priorities to enable continued improvement in the management of weeds and pest animals.

NRM groups

- Promote and facilitate weed and pest animal management on agreed local/regional priorities.
- Identify and fund research priorities to enable continued improvement in the management of weeds and pest animals.

Tertiary and other education research facilities

- Undertake research on weeds and pest animals.
- Train and educate people in best practice in the management of weeds and pest animals.

Management arrangements

The stakeholder-based Invasive Plants and Animals Committee will coordinate and monitor the implementation of this strategy.

Additional technical expertise in environmental, economic or social research will be available through relevant government departments.

Terms of reference

- Evaluate and endorse an implementation plan for the strategy that identifies:
    - the status of pest species and their impacts
    - targets to be achieved
    - actions to achieve the targets
    - timeframes, resources needed, and roles and responsibilities of stakeholders
    - performance measures
    - monitoring and evaluation processes
    - reporting mechanisms.
- Endorse industry-specific actions to be referred to relevant industry bodies.
- Provide advice on the coordination, promotion, monitoring and reporting of the implementation of the strategy.
- Establish and ensure ongoing consultation with key stakeholders.
- Provide advice on and identify links with other natural resource planning, implementation, capacity-building, information-sharing, extension and research activities.
- Provide input to assist in evaluating the effectiveness of the strategy implementation.
- Participate in a review of strategic actions after 4 years. At the earliest possible stage, agree on and endorse the timeframes, benchmarks, interim performance indicators and criteria, so that evaluation and review can proceed.
- Report annually through the Biosecurity Queensland Ministerial Advisory Committee.
- Ensure that opportunities are taken and constraints addressed.

Biosecurity Queensland will provide secretariat support to the committee within existing budget constraints.

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Appendix 1: Pest animal management outcomes and actions (by species)

Species	Operational aim	Required actions
Red-eared slider turtle (*Trachemys scripta elegans*)	Eradicate red-eared slider turtles statewide	Prevention and control program
Dingo (Canis lupus dingo)	**Exception:** dingoes in national parks Destroy dingoes in areas protected by physical and chemical barriers such as the wild dog barrier fence (WDBF) Prevent dingo movement into protected pastoral areas (south of the WDBF) Reduce dingo numbers in other situations, particularly where they have or could have significant environmental, economic or social impacts	**Exception:** dingoes in national parks **South of the WDBF:** land owner or occupier to destroy all dingoes **North of the WDBF:** land owner or occupier to take reasonable actions to control dingoes **More information:** Wild dog management strategy 2011–16

Species	Operational aim	Required actions
Dog, other than a domestic dog (*Canis lupus familiaris*)	Destroy wild dogs in areas protected by physical and chemical barriers (such as the WDBF) Prevent wild dog movement into protected areas (south of the WDBF) Reduce wild dog numbers in other situations, particularly where they have or could have significant environmental, economic or social impacts	**South of the WDBF:** land owner or occupier to destroy all wild dogs **North of the WDBF:** land owner or occupier to take reasonable actions to control wild dogs **More information:** Wild dog management strategy 2011–16
European fox (*Vulpes vulpes*)	Prevent the spread of foxes into new areas, particularly Far North Queensland Remove small populations of foxes from Far North Queensland Reduce fox numbers elsewhere, particularly where they have or could have significant environmental, economic or social impacts	Local government areas of Cassowary Coast, Etheridge, Croydon, McKinlay, Cloncurry and Mount Isa and areas north: land owner or occupier to destroy all foxes **Rest of state:** land owner or occupier to take reasonable actions to control foxes
European rabbit, domestic and wild breeds (*Oryctolagus cuniculus*)	Prevent rabbits moving into the Darling Downs – Moreton Rabbit District Destroy all rabbits in this protected area Continually suppress rabbit numbers elsewhere in the state, particularly where they could have significant environmental, economic or social impacts	**Darling Downs – Moreton Rabbit District:** land occupier to take all reasonable action to destroy all rabbits and rabbit harbours **Rest of state:** land occupier to take all reasonable action to control rabbits and rabbit harbours **More information:** proof of existence of rabbits is a burrow that shows evidence of recent use by rabbits or any other evidence on that land of the existence of rabbits; see *Rabbit control in Queensland: a guide for land managers*
Feral chital (axis) deer (*Axis axis*)	Limit chital deer population spread in the established range (specified areas in North Queensland) and suppress populations in this range that have significant environmental, economic or social impacts Remove newly established chital deer populations from other parts of the state, to limit population spread and continuously suppress populations	**Specified areas in North Queensland:** land occupier to take all reasonable action to limit the spread of deer **Rest of state:** land occupier to take all reasonable action to destroy deer **More information:** Feral deer management strategy 2013–18
Feral fallow deer (*Dama dama*)	Limit fallow deer population spread in the established range (specified areas in South East Queensland near Stanthorpe) and suppress populations in this range that have significant environmental, economic or social impacts Remove newly established fallow deer populations from other parts of the state, to limit population spread and continuously suppress populations	**Specified areas in South East Queensland:** land occupier to take all reasonable action to limit the spread of deer **Rest of state:** land occupier to take all reasonable action to destroy deer **More information:** Feral deer management strategy 2013–18

Species	Operational aim	Required actions
Feral pig (*Sus scrofa*)	Eradicate small, isolated or new feral pig infestations Reduce feral pig numbers in other situations, particularly where they have or could have significant environmental, economic or social impacts	Prevent the spread of and, as far as possible, remove all populations of feral pigs
Feral red deer (*Cervus elaphus*)	Limit red deer population spread in the established range (specified areas in South East Queensland), and suppress populations in this range that have significant environmental, economic or social impacts Remove newly established red deer populations from other parts of the state, to limit population spread and continuously suppress populations	**Specified areas in South East Queensland:** land occupier to take all reasonable action to limit the spread of deer **Rest of state:** land occupier to take all reasonable action to destroy deer **More information:** Feral deer management strategy 2013–18
Feral rusa deer (Cervus timorensis or Rusa timorensis)	Limit rusa deer population spread in the established range (Prince of Wales, Horn, Friday, Saibai, Wednesday, Boigu, Entrance and Hammond islands), and suppress populations in this range that have significant environmental, economic or social impacts Remove newly established rusa deer populations from other parts of the state, to limit population spread and continuously suppress populations	**Specified areas in Torres Strait Islands:** land occupier to take all reasonable action to limit the spread of deer **Rest of state:** land occupier to take all reasonable action to destroy deer **More information:** Feral deer management strategy 2013–18
Feral goat (*Capra hircus*)	Eradicate small, isolated feral goat populations Manage the environmental, economic and social impacts of established feral goat populations	Prevent the spread of and, as far as possible, remove all populations of feral goats
Cat, other than a domestic cat (*Felis catus*)	Reduce feral cat numbers, particularly where they have or could have significant environmental, economic or social impacts Take preventive measures to minimise the formation of stray cat populations that act as a source of new feral cat populations	Prevent the spread of and, as far as possible, remove all populations of feral cats
All species that may be kept only under permit	Ensure permit conditions are adequate to prevent release Eradicate any feral populations statewide	

Appendix 2: Weed management outcomes and actions

Outcome	Area actions	Applicable area	Species
Prevention Maintain Queensland's pest-free status	Prevent introduction Remove from trade	All of the state	Acacias *senu lato* species non-indigenous to Australia and not yet

Outcome	Area actions	Applicable area	Species
			present in Queensland Anchored water hyacinth Annual thunbergia Boneseed Candleberry myrtle Cholla cactus species not yet present in Queensland Christ's thorn *Chromolaena* species not yet present in Queensland Eurasian water milfoil Fanworts species not yet present in Queensland Floating water chestnuts Harrisia cactus species not yet present in Queensland Honey locust species not yet present in Queensland Horsetails Kochia Lagarosiphon Mesquites not yet present in Queensland Mexican bean trees not yet present in Queensland Miconia species not yet present in Queensland Mikania species not yet present in Queensland Peruvian primrose Prickly pear species not yet present in Queensland Red sesbania Salvinias not yet present in Queensland Serrated tussock Spiked pepper Water soldiers Witchweeds (other than red witchweed)

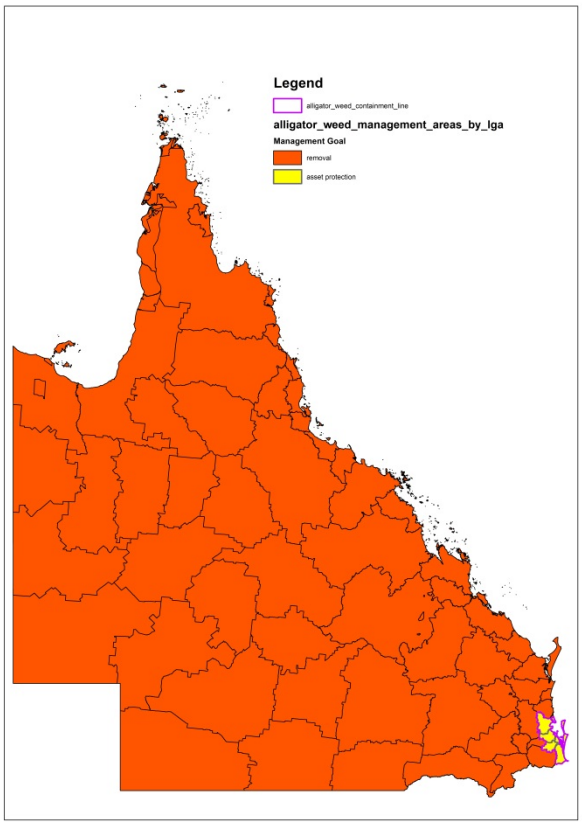
Outcome	Area actions	Applicable area	Species
Eradication Return Queensland to pest-free status	Remove every plant and seed bank Prevent the spread of reproductive material Prevent reintroduction Remove from trade	All of the state	Bitou bush Bridal creeper Bunny ears Hudson pear Jumping cholla Karroo thorn Koster's curse Limnocharis Madras thorn Mexican bean tree Mexican feather grass Miconia Mikania vine Mimosa pigra Opuntia elata Red witchweed Tropical soda apple Water mimosa
Containment Prevent spread to pest-free **areas** and minimise the impact on particular assets; may include maintaining a pest-free status in some areas or regions and returning others to a pest-free status	**Area A** Remove every plant Prevent the spread of reproductive material Prevent reintroduction Remove from trade **Area B** Reduce the number of plants Prevent the spread of reproductive material into Area A Minimise the spread of reproductive material into uninfested parts of Area B Minimise the spread of reproductive material into parts of Area B under active control Remove from trade	See Appendix 3 for indicative locations of Area A (removal) and Area B (asset protection)	Alligator weed Badhara bush Bellyache bush Chilean needle grass Coral cactus Fireweed Gamba grass Honey locust Hygrophila Kudzu Olive hymenachne Pond apple Prickly acacia Rubber vine Senegal tea plant Siam weed Telegraph weed Water hyacinth Water lettuce
Asset protection Minimise/reduce the rate of spread of the weed to pest-free **places** and reduce the impact of the weed on assets at **places** where the weed is currently found	Reduce impact of the weed on assets Minimise the spread of reproductive material into uninfested areas or into areas under active control Remove from trade	All of the state	African boxthorn African fountain grass African tulip tree American rat's tail grass Annual ragweed Asparagus fern Athel pine Balloon vine Blackberry Blue thunbergia (laurel

Outcome	Area actions	Applicable area	Species
			clock vine) Broad-leaf privet (tree privet) Broad-leaved pepper tree Cabomba Camphor laurel Candyleaf Cat's claw creeper Chinee apple Chinese celtis Chinese privet Common pest pear Creeping lantana Devil's rope pear Drooping tree pear Dutchman's pipe Elephant ear vine Foetid cassia Giant Parramatta grass Giant rat's tail grass Giant sensitive plant Gorse Groundsel bush Hairy cassia Harrisia cactus Harungana Honey mesquite Kahili ginger Madeira vine Mesquite or algarroba Mother-of-millions Mother-of-millions hybrid Ornamental rubber vine Parkinsonia Parthenium Quilpie mesquite Salvinia Sicklepod Singapore daisy Small-leaf privet Snake cactus Spiny pest pear Tiger pear Tobacco weed Velvety tree pear Westwood pear White ginger Willows Yellow bells

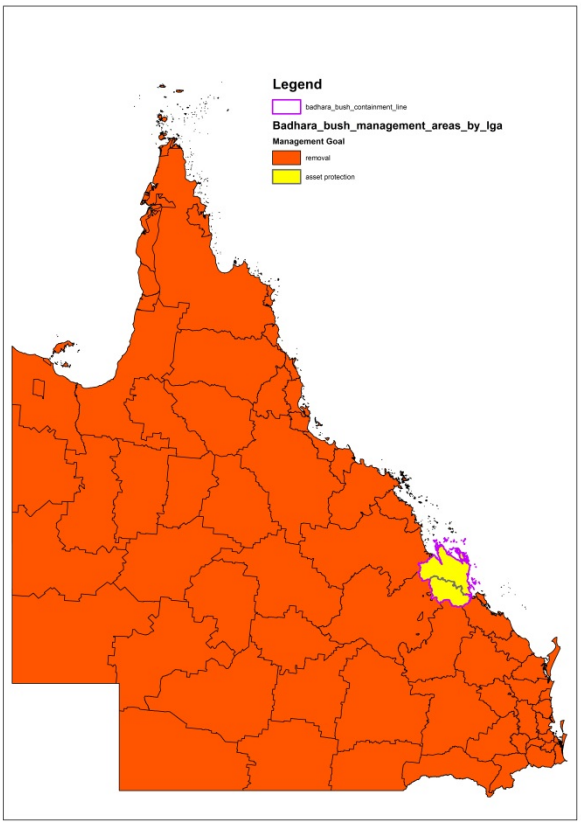
Outcome	Area actions	Applicable area	Species
			Yellow ginger Yellow oleander (Captain Cook tree)

Appendix 3: Maps of containment areas

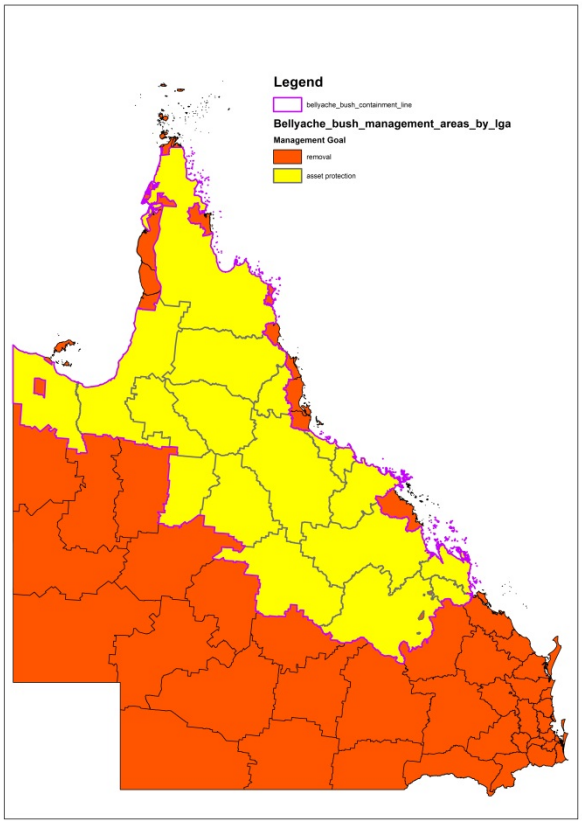
Alligator weed



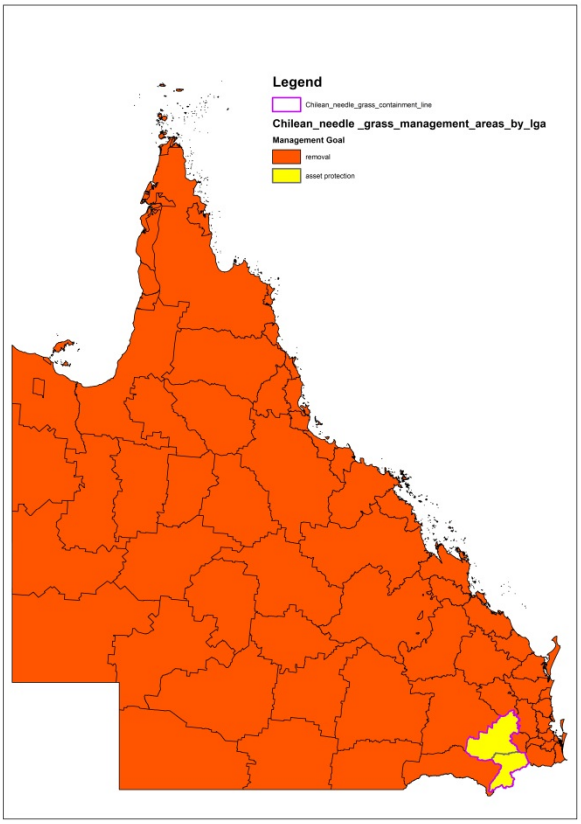
Badhara bush



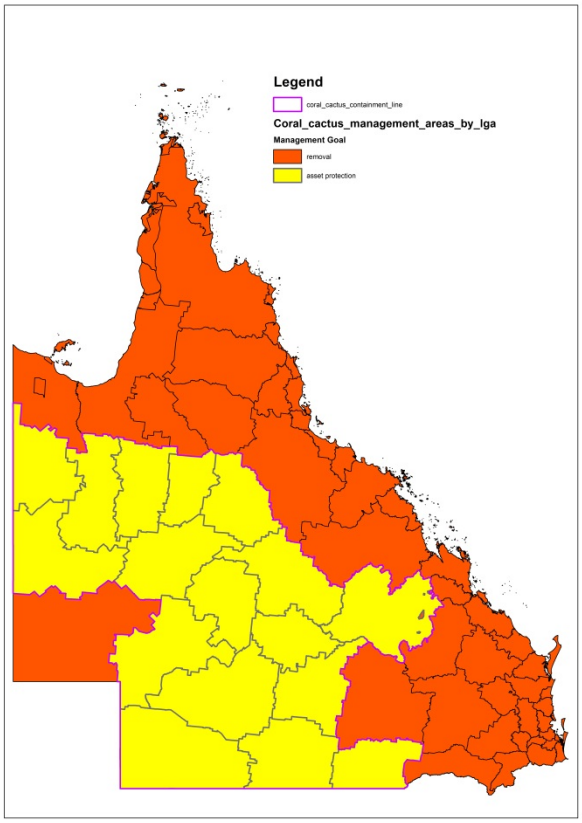
Bellyache bush



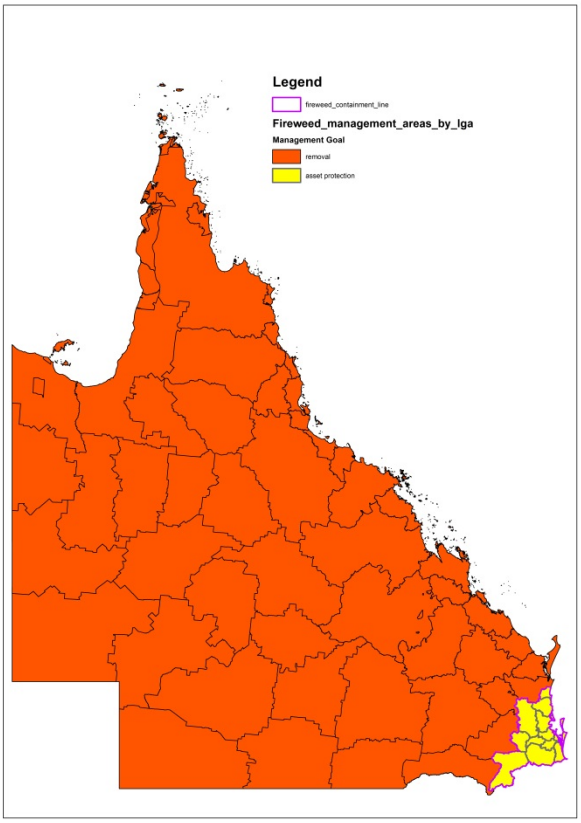
Chilean needle grass



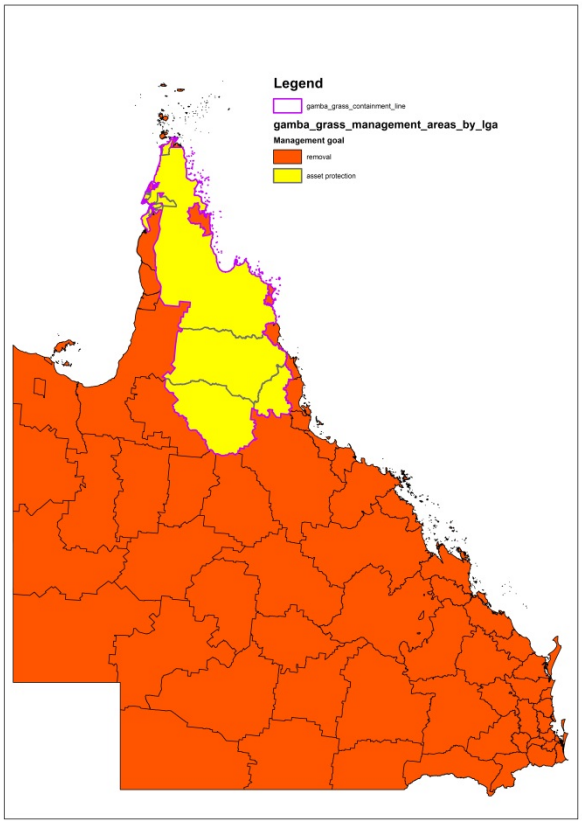
Coral cactus



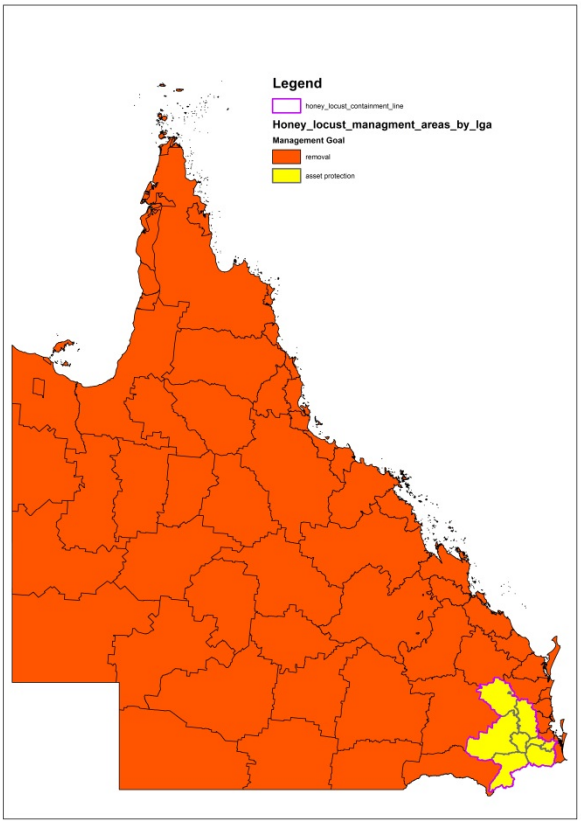
Fireweed



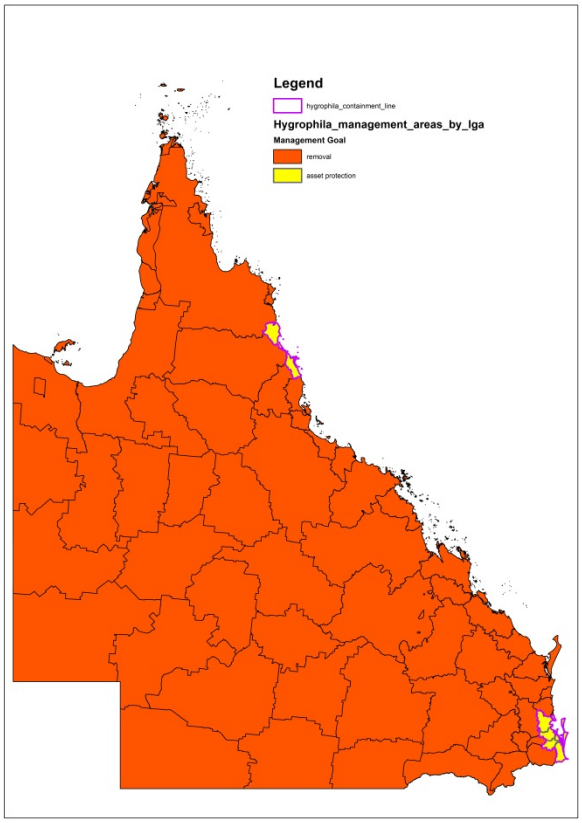
Gamba grass



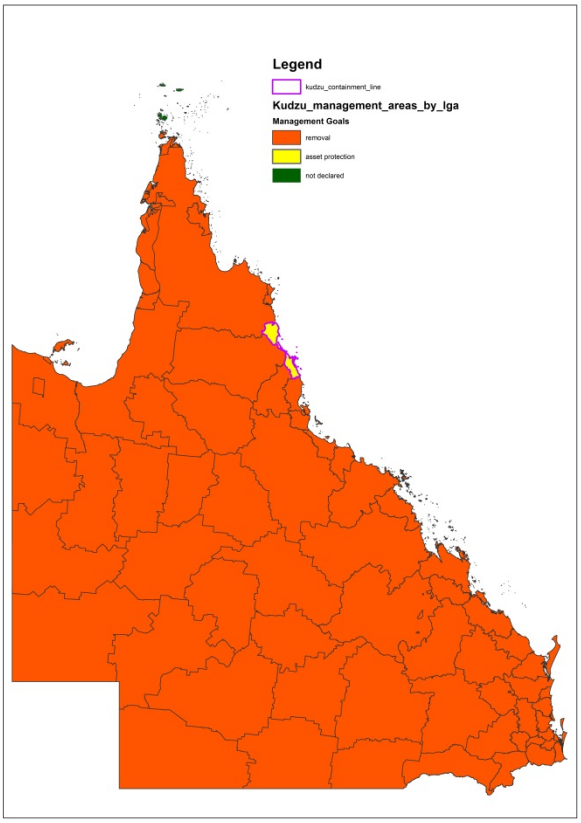
Honey locust



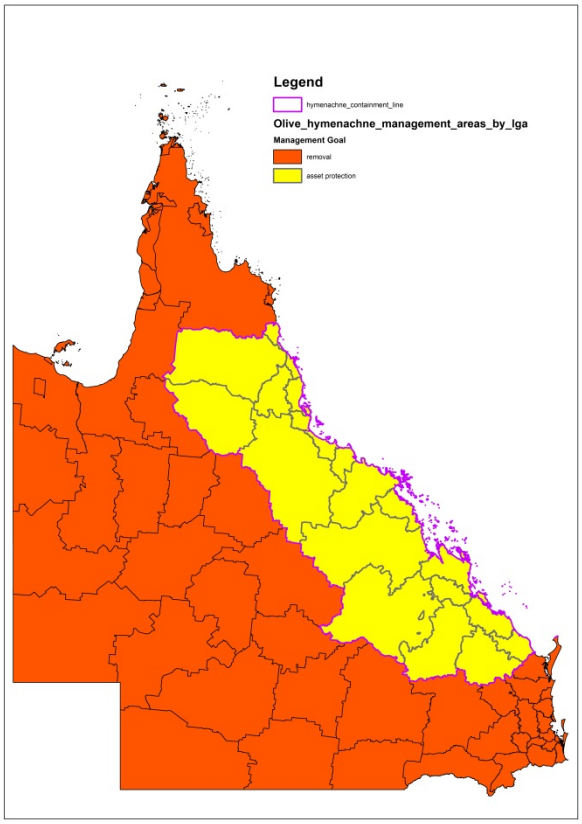
Hygrophila



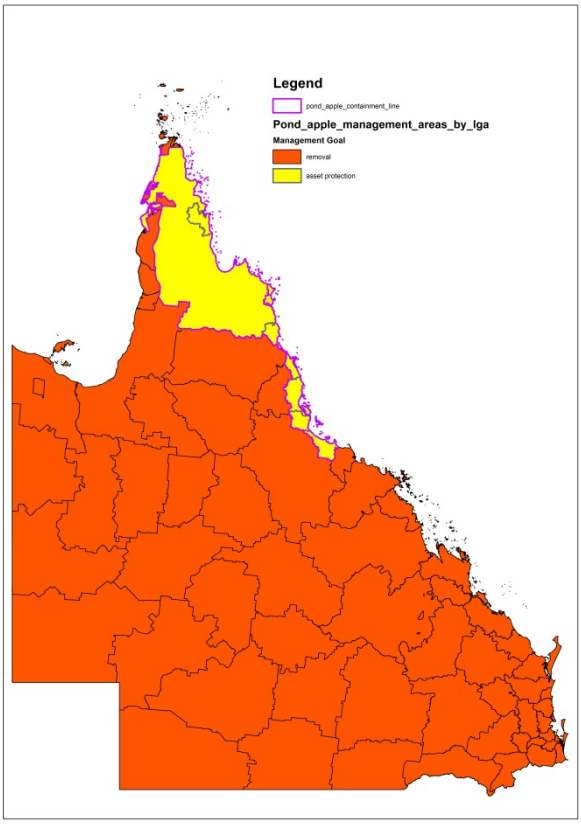
Kudzu



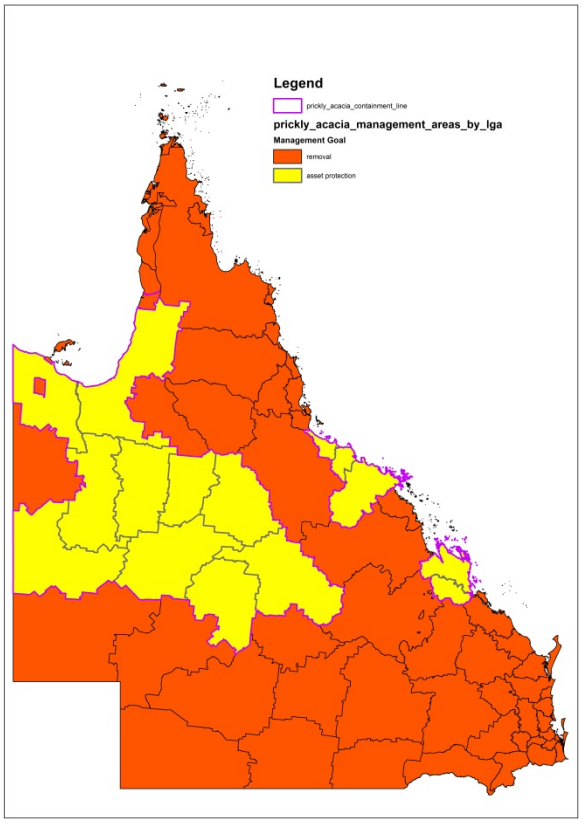
Olive hymenachne



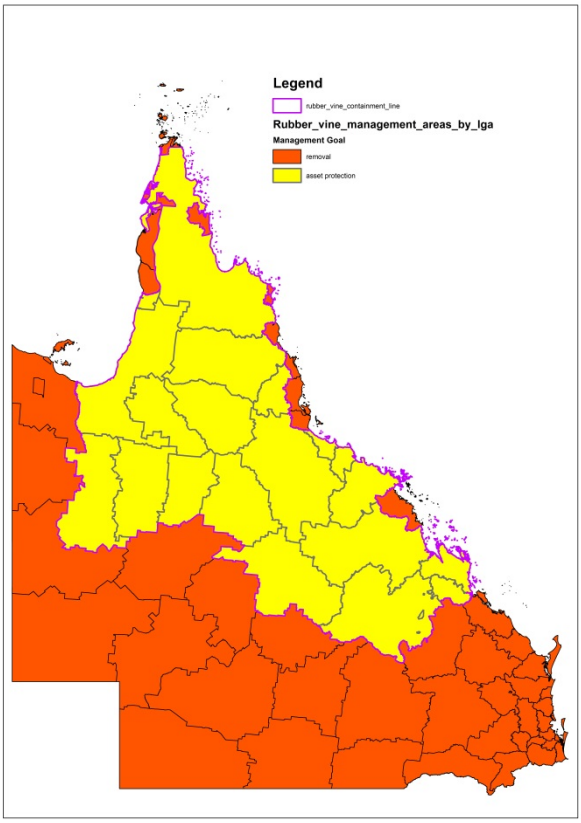
Pond apple



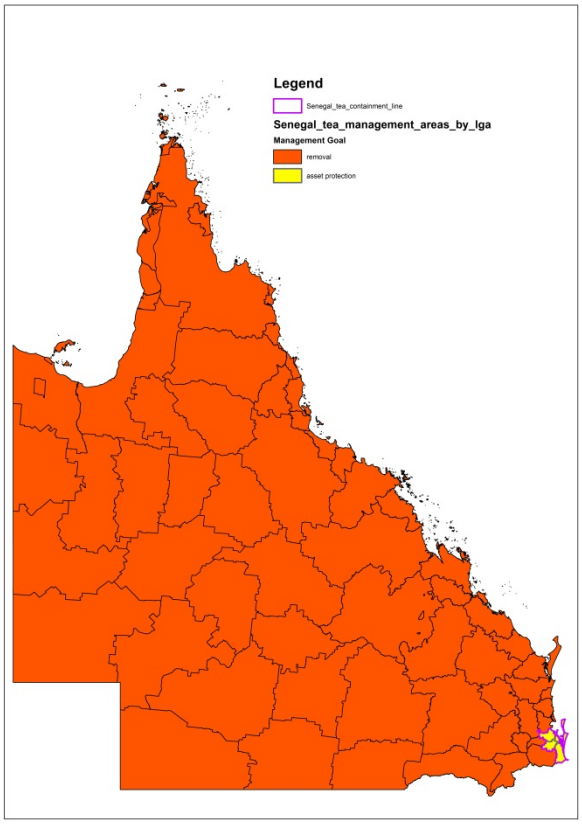
Prickly acacia



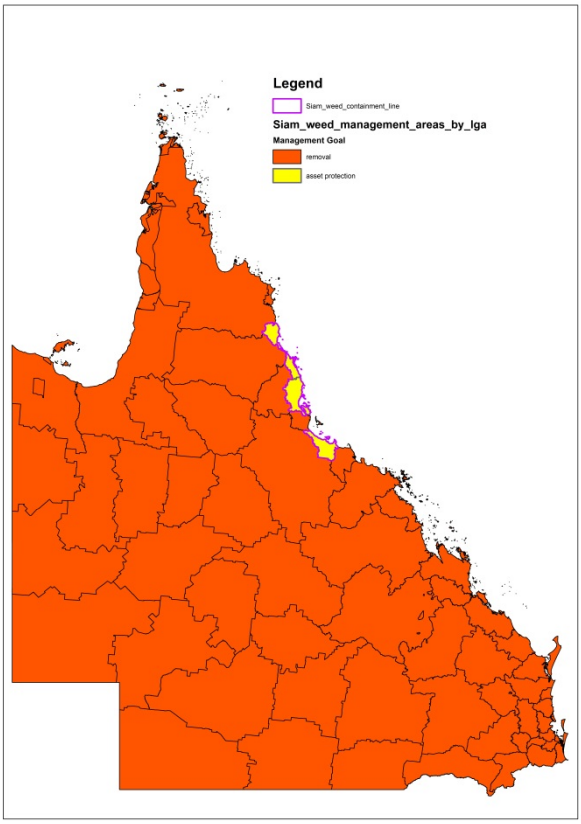
Rubber vine



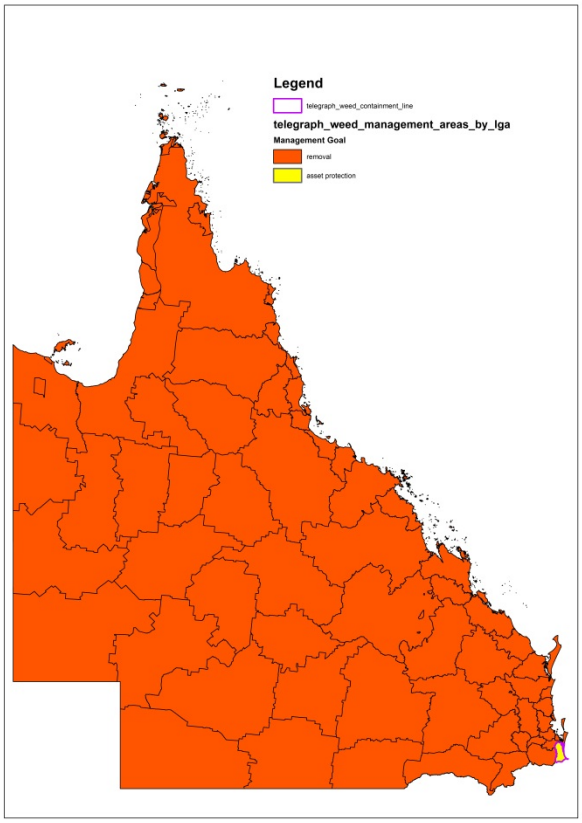
Senegal tea



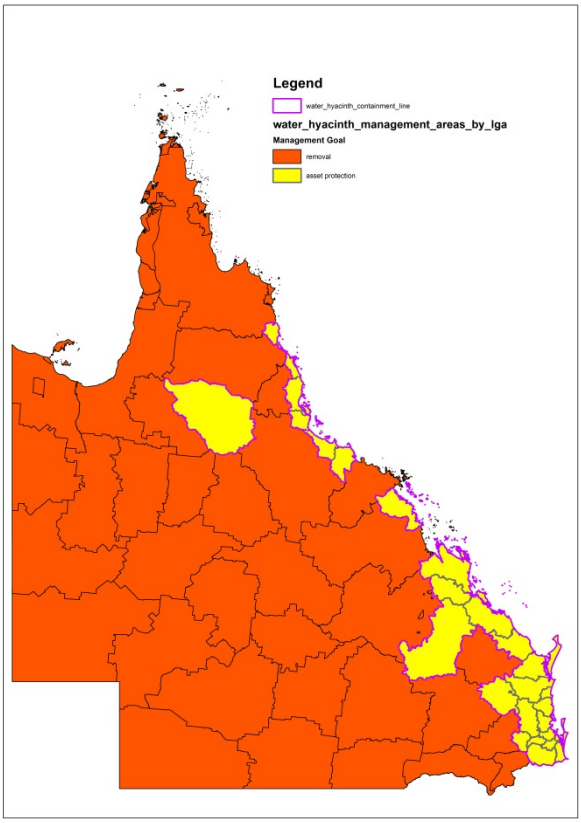
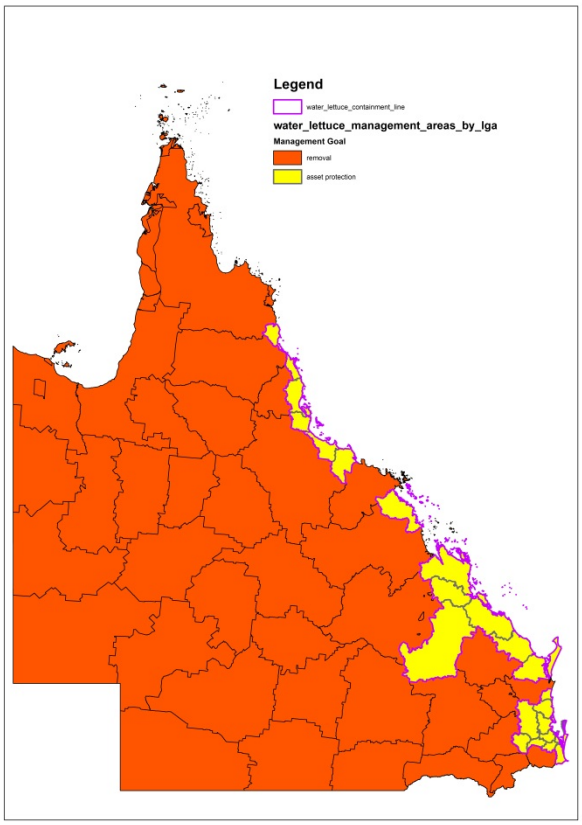
Siam weed



Telegraph weed



Water hyacinth



Water lettuce