CONVENTION ON BIOLOGICAL DIVERSITY (CBD) NOTIFICATION 2015-052

Information on Invasive Alien Species Management

Submission by Australia

NOTE: Information provided in this response has been drawn from Australian and sub-national government agency inputs.
Australia recognises the importance of managing the risks posed by invasive alien species for the conservation of biodiversity. As an island nation, with flora and fauna communities that have been isolated for long periods of time, much of Australia’s unique biodiversity is sensitive to disturbance and impacts of invasive alien species.

This response is presented in a format that follows the questions raised in notification 2015-052.

Exploration of ways and means to address the risks associated with trade in wildlife introduced as pets, aquarium and terrarium species, and as live bait and live food (paragraph 4 of decision XII/16), as well as methods of alerting suppliers and potential buyers to the risk posed by invasive alien species sold via e-commerce (paragraph 9 (d) of decision XII/17)

AUSTRALIAN BIOSECURITY

Over the past 200 years or so, thousands of alien (non-native) species have been deliberately and inadvertently brought in to Australia. These alien species include plants, animals, fungi and microorganisms. Some reasons these species have been purposefully imported are for ‘acclimatisation’, agricultural production, transportation, pets and pest control. Accidental introduction can occur due to the trade of other goods via sea or air. Alien species that have become invasive in Australia sometimes have a history of becoming established in other countries, but generally have the following attributes:

- high fecundity (reproductive rate);
- generalist diet (for animals);
- an ability to live in disturbed and modified environments;
- a climatic match between Australia (or parts of Australia) and their area of natural occurrence.

Invasive species are among the most serious threats to Australia’s natural environment, primary production industries and human health. Invasive species can displace native species, compete with native species for habitat and other resources, predate upon native species, modify and degrade landscapes and reduce ecosystem resilience to other threats. Australia has remained free of many pests and diseases that have severe impacts in other parts of the world; however, there are significant legacy issues presented by established alien species and future challenges that require ongoing vigilance in biosecurity.

For over a century, biosecurity legislation and regulation has played a critical role in reducing the risk of invasive alien species introduction to Australia. Although Australia’s geographical isolation has also played a role in reducing the incidence of introduction, the barriers of time and distance are becoming less relevant as international travel and trade increase.

The Australian Government’s approach to management and containment of invasive species is consistent with the World Trade Organisation’s Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement). Like many other countries, Australia expresses its ‘appropriate level of protection’ (ALOP) in qualitative terms. Australia’s ALOP, which reflects community expectations through Australian Government policy, is currently expressed as providing a high level of sanitary and phytosanitary protection, aimed at reducing risk to a very low level, but not zero.

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Within Australia’s biosecurity framework, the Australian Government uses formal risk analyses to assist in considering the level of biosecurity risk that may be associated with the importation or proposed importation of animals, plants or other goods.

Australia works across the full biosecurity continuum, including managing risks offshore, at the border and onshore. The biosecurity system involves cooperation and collaboration between several Australian Government agencies; primarily the Department of Agriculture, the Department of the Environment and the Department of Immigration and Border Protection. The system is legislated under several national laws\(^3\) and State and Territory (sub-national jurisdiction) laws. The *Biosecurity Act 2015* (Cth), which will commence on 16 June 2016, will provide the Commonwealth with additional capability to work with sub-national governments to manage pest and disease incursions through new onshore powers.

**REGULATION OF LIVE ANIMAL IMPORTS**

Australia has strict controls on the importation of live animals for any purpose, including as pets, aquarium and terrarium species, live bait or live food. These controls may encompass several regulatory agencies or laws, depending on the species and its proposed end use(s).

**National environmental legislative considerations**

The Australian Government Department of the Environment (the Department) conducts an environmental risk assessment posed by the species as per the *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act). Species that may be imported live into Australia must be included on the List of Specimens Taken to be Suitable for Live Import (live import list) under the EPBC Act.

The live import list is divided into two parts, a list of unregulated live specimens (Part 1), and another list of allowable but regulated live specimens (Part 2), which are subjected to restrictions or conditions that mitigate their potentially harmful impact on the Australian environment. Species not listed on either part are prohibited from live import. All live animals listed on Part 2 of the list require an import permit issued by the Department prior to importation. To obtain a permit, applicants must demonstrate that they meet any conditions or criteria relevant to that species as per the live import list and the EPBC Act.

Anyone can make an application to the Environment Minister to amend the live import list to include a new species. The applicant must provide a report that assesses the potential impacts on the environment of the proposed amendment should they escape or be released into the wild (Terms of Reference at Attachment A). Each species proposed for inclusion on the live import list is the subject of a detailed assessment.

Before amending the list, the Environment Minister must consult with appropriate Commonwealth, and sub-national ministers, and may also consult with other persons and organisations. The Environment Minister must also consider an assessment report (prepared by an applicant, or prepared on the Minister’s initiative), and the report must be published for public comment. All comments received are considered by the applicant in finalising their report, and subsequently by the Environment Minister in making a decision.

The focus of the assessment is on the potential impacts on the environment of the animal to be listed, rather than the diseases or pathogens that may be imported with it. The Australian Government Department of Agriculture (Department of Agriculture) assess disease risks of proposed imports.

The document of *Risk assessment models for establishment of exotic vertebrates in Australia and New Zealand* provides further context on the types of risk assessment processes employed by the Department to inform decisions in relation to import of live animals under the EPBC Act. The report also outlines the type of information that may be required as part of the draft assessment report to inform a scientific-based risk assessment as to the potential suitability of different types of exotic animals for live import into Australia.

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\(^3\) Including the *Customs Act 1901*, the *Quarantine Act 1908* and the *Environment Protection and Biodiversity Conservation Act 1999*. The objectives of these legislative instruments are complementary, but different.

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**National biosecurity legislative considerations**

The Quarantine Act 1908 (Cth) and its delegated legislation, administered by the Department of Agriculture, is the primary means of regulating the importation of goods into Australia, including live animals. The Biosecurity Act 2015 (Cth), which will commence on 16 June 2016, will replace the Quarantine Act.


- relevant risk management measures have not been established; or
- relevant risk management measures for a similar species and pest or disease combination do exist, but the likelihood or consequence of entry, establishment or spread of pests or diseases could differ significantly from those previously assessed.

Alternatively, risk assessments may be undertaken for proposed imports that do not meet the above criteria; in these cases, the assessment is undertaken as a ‘non-regulated’ analysis of existing policy (scientific review).

The IRA or scientific review must conclude the animal health risks posed by the commodity can be managed to an acceptable level for the import to occur. Once the risk level is established as acceptable, the Department of Agriculture can develop an import policy.

When the import policy is finalised, the Department of Agriculture can issue import permits. All live animals imported into Australia, except dogs and cats imported from New Zealand, require an import permit to be issued. The relevant import conditions will vary depending on the species and can include offshore, at the border or onshore requirements (e.g. pre-export testing, inspection or post-arrival quarantine).

The Department of Agriculture maintains the ‘Import Conditions Database’, which is a repository of the relevant conditions of import for a range of commodities including live animals. Live animals that are not on the Import Conditions Database are not permitted to be imported, as the pest or disease risk may be considered too great, or an import risk analysis may not have been conducted to establish conditions for safe import.

**International endangered species import requirements**

Persons wanting to import live species to Australia must also check whether the species is listed under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and whether additional permits from the exporting country (in addition to the import permit from the Department) are required. CITES species must also be listed on Part 2 of the live import list to allow their import, with imports generally restricted to non-commercial entities such as zoos. The Checklist of CITES species can be accessed at [http://checklist.cites.org/#/en](http://checklist.cites.org/#/en).

**Compliance and Enforcement**

The Department of Agriculture utilises a range of measures for managing risks associated with the importation of live animals. Generally, powers for seizure, testing/treatment, containment (i.e. quarantine) are all available under biosecurity legislation. The majority of live animals are all directed, under quarantine order, into a Quarantine Approved Premises (or a government facility) as per import permit conditions. Illegal imports are managed differently – generally, export or euthanasia applies. Where necessary, powers are applied at the border to order live animals into quarantine, to search and where necessary seize species that have been imported into Australia in contravention of biosecurity requirements. Measures to monitor
compliance are regularly deployed and include audits of premises that have entered into arrangements with the Department of Agriculture for the performance of quarantine. If necessary, those arrangements may be revoked where non-compliance is identified. In the event a biosecurity risk is considered too high, risk mitigation options include requirements for re-export, performance of quarantine and where necessary, euthanasia.

At times investigations are undertaken in response to deliberate breaches of import requirements and serious non-compliance. Where appropriate, individuals and the businesses they represent will be prosecuted for the commission of criminal offences contained within biosecurity legislation. Where a history of non-compliance is known to exist, the Department of Agriculture will utilise targeting options directed toward a particular species, business or importer.

Provision of Information for Travellers and Online Shoppers

The Department provides the information below to online shoppers seeking to purchase exotic species via e-commerce (see [http://www.environment.gov.au/biodiversity/wildlife-trade/travellers-shoppers/online-internet-shopping-mail](http://www.environment.gov.au/biodiversity/wildlife-trade/travellers-shoppers/online-internet-shopping-mail)):

You may be purchasing products containing plants or animal derivatives that are listed under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), from overseas based companies or you may be unaware of inclusion of plant or animal products in your purchases e.g. complementary medicines.

Before you receive mail from overseas be sure that any plant or animal products included in the item you wish to purchase can be imported legally into Australia. If a product made from CITES listed plant or animal products is sent to you from overseas and is not accompanied by the proper permits, it may be seized by Customs and you could face severe penalties (up to 10 years imprisonment and $180,000 fine).


Australian sub-national jurisdiction legislation case study: Queensland

The Biosecurity Act 2014 (Qld) has been passed by the Queensland Parliament and is due to commence in mid-2016. The Biosecurity Act 2014 will change the way the sub-national jurisdiction manages biosecurity threats. It provides a more comprehensive range of response tools and powers that can be tailored to address the unique challenges presented by each biosecurity threat. Implementation of the legislation is an opportunity for a more outcome-focused and risk-based approach to ongoing management of pests and diseases with less prescriptive regulation. It will also introduce new obligations for all state residents. In particular it will introduce a general biosecurity obligation and promote shared responsibility, which are key features of the new legislation.

Current Queensland regulation under the Land Protection (Pest and Stock Route Management) Act 2002, and continued under the Biosecurity Act 2014, prohibits or restricts the keeping, sale or release of wide variety of declared pest species. The use of a ‘white list’ (list of approved species) for import of live animals in Queensland provides for the strictest legislative control over animals entering or within the jurisdiction. All animals not on the list are prohibited. This approach:

- Provides legislative control over animals that have not been assessed for biosecurity risk, or cannot be assessed due to lack of information about their potential impacts on the region.
- Enables prosecution for any animal illegally brought into Queensland.
- Stakeholder certainty of what animals are permitted.

Under the Fisheries Act 1994, noxious fish such as carp, gambusia, and tilapia cannot be kept, hatched, reared, sold or released. Some non-indigenous fish from other countries can be kept in Queensland as long
as they cannot escape, such as in an aquarium or in a pond that will not overflow. These allowable aquarium fish species are in-line with the national list of specimens taken to be suitable for live import into Australia. It is an offence to release or cause non-indigenous fish to be released (e.g. pond or dam overflowing or used as bait) into Queensland waters. Fines of up to $220,000 apply for noxious and non-indigenous fish offences and additional penalties may be imposed for eradication measures.

Live bait can only be used in Queensland waters if the fish is native and legally caught in the waters it is to be used as bait in. Aquaculture product, noxious or non-indigenous species cannot be used as bait in Queensland. This is to reduce the risk of exotic species being introduced into Queensland waters and prevent disease transmission to wild populations.

The Queensland Government Department of Agriculture and Fisheries, utilise traditional and social media to raise awareness about the risks associated with keeping illegal pets. For example, a recent social media advertising campaign on illegal reptiles targeted Queensland residents who have known interests in reptiles, amphibians, snakes and lizards and had an expected audience reach of over 200,000 people.

**Synthesis on information from Parties, scientific institutions, and other relevant organizations, on experiences in the use of biological control agents against invasive alien species, in particular the release in the wild of alien species for this purpose, including positive and negative cases and cases of the application of appropriate risk assessment (paragraph 9 (g) of decision XII/17)**

**BIOLOGICAL CONTROL CASES IN AUSTRALIA**

Exotic species that have become invasive in Australia are often not troublesome in their natural distribution. This is because they are regulated by a variety of natural predators, pathogens or physical processes in their natural habitat. Classic biological control aims to use an invasive species’ known natural predators or pathogens to reduce its impact in novel environments. Appropriate and well-informed risk assessment of proposed biological control agents is required and available, to ensure that the control agent does not cause any off-target impacts.

Weather and climate can affect biocontrol agents, like all living organisms. These two factors can slow and even stop the agents building-up to sufficient levels to control the invasive species. Multiple biocontrol agents must often be used together to achieve the desired impacts against invasive species and while biocontrol does not normally eradicate an invasive species, it can control it enough to enable the use other methods at a lower cost. Biocontrol is unlikely to be acceptable where invasive species are very closely related to species of significant cultural or economic value that would also be at risk, unless there are mitigation measures readily available. Similarly, for many pests suitable biological control agents from the native range have not been located despite exhaustive searching.

Australia has been using biological control to manage exotic pests and weeds successfully for over 100 years. Biological control for vertebrate pests has been successful for the control of the European rabbit, and research into a biological control program against European carp is currently underway. Biological control has also been highly successful against invertebrate pests where more than 150 species have been targeted and 50 of these are now no longer important pests. Some specific examples of successful biological control cases are:

- Biological control of Prickly Pear (*Opuntia stricta*), using the Cactoblastis Moth (*Cactoblastis cactorum*) to has managed Prickly Pear populations to well under economic thresholds for more than 80 years, generating $3 billion AUD benefits, with no off-target effects due to the specificity of the moth larvae’s diet.

- Biological control of the European rabbit (*Oryctolagus cuniculus*) has also been the only effective way to significantly reduce European rabbits across Australia. Myxoma virus was released in 1950, followed by rabbit haemorrhagic virus disease in 1995, causing regular disease outbreaks in wild
rabbits. Together, they have kept rabbit numbers well below the devastating pre-1950s levels without any off-target impacts; the only example of a successful large-scale biocontrol program against a vertebrate pest anywhere in the world. Rabbits have developed some resistance to these pathogens since release and hence new virulent strains are under development to ensure long-term effectiveness.

In response to a request from the Department, the Australian Government Department of Agriculture has issued a draft risk analysis report assessing an application to release the microhymenopteran parasitoid *Tachardiaephagus somervillei* for the biological control of yellow lac scale (*Tachardina aurantiaca*) on Christmas Island (available at [http://www.agriculture.gov.au/SiteCollectionDocuments/ba/memos/2015/draft-ra-tachardiaephagus-somervillei-biological-control-yellow-lac-scale.pdf](http://www.agriculture.gov.au/SiteCollectionDocuments/ba/memos/2015/draft-ra-tachardiaephagus-somervillei-biological-control-yellow-lac-scale.pdf)). This is an attempt to reduce densities of a primary food source for the introduced yellow crazy ant, which is having significant environmental impacts. In this example, the risk assessment recommends that the release of *Tachardiaephagus somervillei* be permitted, having identified moderate off-target effects with negligible potential consequences associated with its release.

There are some well-known attempts at biological control that have led to environmental impacts in Australia. For example, the Cane Toad (*Rhinella marina*), a native to Central and South America, was introduced in 1935 without an environmental risk assessment in an attempt to control the Grey-Backed Cane Beetle (*Dermolepida albohirtum*) and the Frenchi Beetle (*Lepidota fenchi*). To avoid problems due to invasive and/or destructive biological control agents in future, the risk-based processes for approving their use, developed in the 1970s-1990s, is now accepted internationally. There have been no significant environmental off-target impacts in Australia since the cane toad introductions. Effective risk assessment processes for biological control agent releases are now internationally agreed around a common standard, which are applied in local regulatory processes. Biological control programs are also often international collaborative activities because:

- many IAS are problems around the world and, when effective, biocontrol agents are also globally effective
- biological control programs can be quite costly to set up and so multiple collaborators reduces the per-country cost.

**Biological control in Australian sub-national jurisdictions: Queensland case study**

The Queensland Government has had a long and successful involvement in biological control, particularly weed biological control. Biosecurity Queensland undertakes biological weed control research in Queensland and strict measures are in place to ensure that these agents do not negatively affect native plants and animals or horticultural and agricultural crops. Over 30 weed species have had at least one biological control agent released against them, with many of these weeds being at least partially impacted through biological control.

Overall, biological control of weeds in Australia has yielded an average benefit to cost ratio of 23:1, with many of the major successes occurring in Queensland.

*Prickly pear* (*Opuntia stricta*) was successfully controlled in the 1930s by use of Cactoblastis Moth (*Cactoblastis cactorum*), and is still under successful biological control today. The benefit to cost ratio for this species alone is over 300:1. Many other cactus species have also been successfully controlled in Queensland using beneficial organisms.
Along with the successful control of numerous cactus species, the Queensland Government has successfully controlled rubbervine, groundsel bush, noogoora burr and *Mimosa diplotricha*. Several other species such as crofton weed and parthenium weed have also been significantly impacted by the introduction of biological control agents.

In addition to research on weed biological control, the Queensland Government, in conjunction with CSIRO under the banner of the CRC for Tropical Pest Management and the CRC for Australian Weed Management, developed strategies and improvements in both the science and processes of weed biological control in Australia. This has resulted in improvements to the way host specificity testing of potential biological control agents are conducted and numerous publications in international journals. In addition, the Queensland Government was involved in formal courses geared to overseas researchers, providing training in all aspects of weed biological control.

Many of the highly successful biological control agents released in Queensland and Australia have been introduced into many other countries where weeds are a problem. Such programs have resulted in the successful control of weeds such as *Mimosa diplotricha*, water lettuce, water hyacinth and salvinia in numerous countries around the world.

The Queensland Government’s biological control group continues to undertake research into sourcing biological control agents for weeds of concern in Queensland.

**NATIONAL BIOLOGICAL CONTROL LEGISLATION**

Australia is one of few countries to have biological control legislation: the *Biological Control Act* (1984) with parallel Acts in each Australian sub-national jurisdiction. The *Biological Control Act* was the direct consequence of a legal challenge to a particular biological control program and is aimed to provide some legal protection for government agencies involved in high profile biological control agent releases. When it is applied, targets and agents are declared under the *Biological Control Act*, leading to a requirement of consideration of a public enquiry around risks, costs, and benefits.

**CONTEMPORARY APPROVAL PROCESSES REQUIRED FOR BIOLOGICAL CONTROL AGENTS**

Under current regulatory arrangements, before a biological control agent can be released into the environment, it must be established via scientific risk assessment that the risks associated with release are very low or negligible. This is consistent with Australia’s appropriate level of protection (ALOP).

Risk assessments are led by the Department of Agriculture and carried out by scientific and technical experts, in consultation with scientific specialists and other stakeholders. Based on the risk assessment, the Department of Agriculture provides a recommendation to allow release if the risk is considered to be acceptable. Part of this assessment is ‘host specificity testing’ undertaken by the researcher, which ensures the proposed control agent is specific only to the target species. A host specificity test involves the exposure of species similar to the target to the control agent, within a quarantine containment facility (required infrastructure to undertake a biological control program). Off-target effects are the key consideration in biological control risk assessment. For proposed plant controls, the Department of Agriculture has produced revised Guidelines for the Introduction of Exotic Biological Control Agents for the Control of Weeds and Pest Plants to assist researchers and importers understand the risk assessment process (see [http://www.agriculture.gov.au/biosecurity/risk-analysis/reviews/biological-control-agents/protocol_for_biological_control_agents](http://www.agriculture.gov.au/biosecurity/risk-analysis/reviews/biological-control-agents/protocol_for_biological_control_agents)).

Approval of animal biological control agents is also required under the EPBC Act, and this is administered by the Australian Government Department of the Environment. The Department manages a process that allows a ‘testing permit’ to be issued for the importation of specimens into quarantine-approved facilities for conducting tests to obtain information for assessing potential impacts of the species on the Australian environment. A testing permit will only be issued if it can be demonstrated that the information cannot be obtained without conducting the tests in Australia. Further, under Section 303EE (4) of the EPBC Act, a risk analysis report prepared by the Department of Agriculture may be used by the Environment Minister in
making a determination to include the item on the List of Specimens Taken to be Suitable for Live Import (the live import list). Once host specificity testing is completed, biological control agents can be assessed under the EPBC Act, in which the Environment Minister makes a determination whether to include the item on the allowed live import list.

The Guidelines for the Introduction of Exotic BCAs for the Control of Weeds and Plant Pests define a process managed through the National Biosecurity Committee and its various subcommittees, which involves preparing a nomination for the weed or feral animal species of interest and submitting it for approval as a target of biological control. The target must be approved by the National Biosecurity Committee before permission to release a biological control agent is sought.

| Development of decision-support tools for assessing and evaluating the social, economic and ecological consequences of invasive alien species; cost-benefit analyses for eradication, management and control measures; and tools for examining the impacts of climate change and land-use change on biological invasions (paragraph 9(c) of decision XII/17) |

ASSESSMENT AND DECISION SUPPORT TOOLS

In addition to the above mentioned assessment and decision support tools (risk assessments for the environment and pathogens/diseases); further available tools are detailed below.

Threat abatement plans

The EPBC Act provides for the identification and listing of key threatening processes. These are processes which threaten, or may threaten, the survival, abundance or evolutionary development of a native species or ecological community.

The Environment Minister can decide to develop a threat abatement plan for a listed key threatening process. These plans identify the research, management, and any other actions necessary to reduce the impact of a listed key threatening process on native species and ecological communities. Implementing the plan should assist the long term survival in the wild of affected native species or ecological communities. Threat abatement plans are established under the EPBC Act.

Case study: Threat Abatement Plan for Predation by Feral Cats

The Threat Abatement Plan for Predation by Feral Cats establishes a national framework to guide and coordinate Australia’s response to the impacts of feral cats on biodiversity. It identifies the research, management and other actions needed to ensure the long-term survival of native species and ecological communities affected by predation of feral cats.

The goal of the threat abatement plan is to minimise the impact of feral cats on biodiversity in Australia and its territories by protecting affected threatened species, and preventing further species and ecological communities from becoming threatened. To achieve this goal, the plan has four objectives:

1. Effectively control feral cats in different landscapes.
2. Improve effectiveness of existing control options for feral cats.
3. Develop or maintain alternative strategies for threatened species recovery.
4. Increase public support for feral cat management and promote responsible cat ownership.

Each objective is accompanied by a set of actions, which, when implemented, will help to achieve the goal of the plan.
Spatial and statistical tools to support decision-making for invasive alien species

The Australian Government Department of the Environment uses spatial and statistical tools to support robust decision-making relating to the distribution and threat of invasive alien species, including feral animals and weeds. Through the use of these tools, the Department can analyse the potential impact of invasive species on Australia’s ecological communities and threatened species, and ensure decisions on grant and programme delivery, environmental water delivery and biodiversity are based on best available science.

The Department’s tools consist of:

- a point data dataset consisting of observation data used for direct advice, mapping and to produce distribution models.
- distribution models created from the known location of species, observation points, threat category and number within the region.
- non-spatial data consisting of detailed information on each invasive species and identifying threatened species at risk of impact.
- Remote sensing to delineate change over time in relation to eradication programs.

The information obtained from these tools is used to support a range of programmes and meet statutory requirements.

- Threatened species and ecological communities are protected under a range of Australian laws, the EPBC Act being the principal piece of environmental legislation. Under the EPBC Act, individuals or groups are obliged to avoid, mitigate or offset their impact to threatened species. This includes where a development threatens the survival, abundance or evolutionary development of a native species or ecological community. Using tools to model and map native species and ecological communities supports the identification of threatened species potentially impacted by a proposed development.

- Australia has one of the most extensive programmes in the world to manage our water resources. In line with best practices, potential invasive species are taken into account when delivering environmental water to reduce negative impacts.

- The tools are used to analyse information on vegetation depletion and the distribution of threatened species in a target area and evaluate the environmental value of potential grants to undertake biodiversity conservation and natural resource management.

- Remote sensing is used to monitor the effectiveness of eradication programs and to undertake adaptive management.

OTHER DECISION SUPPORT TOOLS

The Australian Weed Risk Assessment (WRA) system is a national, science-based risk analysis tool for determining the weed potential of a plant. The Department of Agriculture uses the WRA system as a pre-border tool to determine whether an exotic plant proposed for importation into Australia should be permitted entry into Australia based on its weed risk. The WRA is a transparent system meeting Australia’s national and international obligations, including requirements under the EPBC Act and the SPS Agreement.

The WRA system evaluates weed risk based on the biogeography, biology, ecology and plant attributes of the plant proposed for importation. It also considers the risk of social, economic and environmental consequences that may be associated with the importation of the plant.
Australia’s WRA system has been adopted by many countries around the world. The focus of the process can be easily adapted to local requirements. Recent independent studies have shown that Australia’s WRA system is 90 per cent predictive of weed potential and has produced considerable net economic benefits to Australia within a decade. The WRA process is now also being adapted for applications to import exotic fish.

Weed Risk Assessment has also been adapted into Post-Border Weed Risk Assessment for the prioritization of exotic weeds for management already established in the country based on actual and potential social, economic and environmental impacts.

Australian research has also been focusing on prioritization frameworks for ranking the impacts of invasive alien species. Prioritization processes are science based, and may also consider societal values, preferences and perceptions of potential or actual impacts. One of the key prioritization frameworks developed in Australia is the Weeds of National Significance framework (see http://www.weeds.org.au/WoNS/).

**Cost-benefit analyses for eradication, management and control measures**

Australian research has focused on rules, tools and guidelines of what to do based on the state of an incursion along the invasion curve:

- When and how to attempt and evaluate eradication programs against new incursions.
- When if eradication fails or is inappropriate (based on the state of the incursion) containment, strategies should be applied and evaluated.
- When containment is no longer appropriate and asset protection strategies are the last option. For situations where biological control is not possible and asset protection is the only remaining option, Australia has been developing systems based approaches under the concept of systematic conservation planning for assisting decision making around the most suitable management approaches.

**Tools for examining the impacts of climate change and land-use change on biological invasions**

Australian research has also focussed on the potential impacts of climate and land use change on biological invasions. This research has been focussed around the following approaches:

- Pest risk mapping approaches, where process and climate driven models of species distribution and abundance though climate matching and spatially explicit population dynamic modelling using software such as CLIMEX and DYMEX (see http://harvestchoice.org/tools/climexdymex-pestdisease-modeling-harvestchoice-modifications).
- Species distribution modelling based on habitat and climate suitability environmental layers and expert elicitation of likely species environmental and climate preferences. This can then be linked to future regional climate models outputs.
- Tool for Assessing Pest or Pathogen Airborne Spread (see https://tappas-staging.intersect.org.au/login/auth). This novel approach allows modelling of aerially borne species movement based on current and future expected climate data sets.
- Structured decision-making tools and processes for managing invasive alien species based on impact and processes for adaptive governance for invasive species management for governments.

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• Development of prioritization frameworks to assess strategies for managing threats to biodiversity under climate change and apply it to the management of invasive species. Information is collected from key stakeholders and experts on the impacts of invasive species on a region's most threatened species and all potential management strategies. Assisted by models of current distributions of threatened species and their projected distributions, experts estimated the cost, feasibility and potential benefits of each strategy for improving the persistence of threatened species with and without climate change.

Development of science-based tools and management practices by Australian sub-national jurisdictions: Queensland

Biosecurity Queensland conducts innovative, applied research to better manage Queensland's worst weeds and pest animals to reduce their impacts. In collaboration with national and international partners, the Invasive Plant and Animal Science unit in Biosecurity Queensland delivers science-based tools and management practices to Queensland landholders, local governments and other land managers. They also provide a better understanding of pest species' ecology and impacts, which are critical to their management.

Example projects being undertaken in Queensland are below.

**Diet of feral pigs, foxes and feral cats**

The project will quantify damage to grain crops from feral pigs, which will be supplemented with dietary information to assess seasonal changes in diet, potential impacts on production and biodiversity. This dietary composition, and possible overlap of diets between feral pigs, foxes and feral cats will also be explored. Improving our understanding of the diet of pests can assist in formulating management strategies by determining the likely prey potentially at risk from predation, targeting control for periods when prey (or predators) are most at risk, or when alternative food abundance is low.

**Controlling rubber bush (Calotropis procera) in northern Australia**

Several prioritisation processes have listed calotrope/rubber bush (*Calotropis procera*) as an important economic and environmental weed in northern Australia’s Rangelands, where it is distributed over several million hectares across the Northern Territory, the Kimberley and north-west Queensland. Dense calotrope infestations appear to reduce livestock carrying capacity, increase control costs and increase mustering costs. However there is conjecture whether calotrope spread is a symptom or cause of poor land condition. A project will improve understanding of the distribution and rate of spread (at several locations), reproductive biology, invasiveness and control of calotrope, and focus on improving control options.

**RESEARCH AND DEVELOPMENT FOR ASSESSMENT AND DECISION SUPPORT TOOLS**

**National Environmental Science Programme**

Under the Australian Government’s National Environmental Science Programme (NESP), some of Australia’s top research institutions will receive funding to address, and provide solutions to, a wide range of environmental and climate science priorities, including the management of invasive species.

**Commonwealth Scientific and Industrial Research Organisation (CSIRO)**

The Australian Government invests $700 million AUD per year into CSIRO to undertake research and development on national priorities. This includes research to support Australia’s social, environmental and economic wellbeing in the face of global biosecurity threats by reducing the risk of pests and diseases entering Australia and improving the effectiveness of eradication and management responses for existing biological threats.
Centre of Excellence for Biosecurity Risk Analysis

The Australian Government has awarded the University of Melbourne a four year (2013-2017) grant of $7.8 million AUD for the establishment of the Centre for Excellence for Biosecurity Risk Analysis from July 2013. The centre is intended to build on the work of the Australian Centre of Excellence for Risk Analysis, which was established in 2006 at the University and has gained international recognition in its field.

The purpose of the centre is to continue to support the advancement of biosecurity risk management through the provision of expertise in risk analysis techniques and the development of associated methods, protocols, tools and procedures.

The objectives of the Centre are to deliver practical, rigorous solutions and advice related to the assessment, perception and communication of biosecurity risk. A particular focus will be to collaborate and engage with end users to improve adoption of methods and increase the impact of research findings to benefit both government and the broader community.

The Centre has attracted broader attention, including internationally, and many government agencies indicated their interest in contributing to the centre in the new funding round. This arrangement will keep Australia and its partners at the forefront of biosecurity risk management.
Australia’s Submission to CBD Notification 2015-052

For-Official-Use-Only

Attachment A: Applications to amend the live import list

Terms of Reference

1. Provide information on the taxonomy of the species.

2. Provide information on the status of the species under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). For example, is the species listed on CITES Appendix I, II or III, and if so, are there any specific restrictions on the movement of this species? Include information on the conservation value of the species.

3. Provide information about the ecology of the species. Include, but do not restrict your response to:
   - lifespan of the species
   - size and weight range
   - the natural geographic range
   - habitat
   - diet, including potential to feed on agricultural plants
   - social behaviour and groupings
   - territorial and aggressive behaviours
   - natural predators
   - characteristics that may cause harm to humans and other species.

4. Provide information on the reproductive biology of the species, including
   - the age at maturity (first breeding)
   - how frequently breeding occurs
   - if the female can store sperm
   - how many eggs or live-born young are produced at each breeding event
   - if the species has hybridised with other species (both in the wild and in captivity) or has the potential to hybridise with any other species
   - if the species can hybridise, are the progeny fertile.

5. Provide information on whether this species has established feral populations, and if so, where those populations are. Include information on whether this species has been introduced to other countries, even if it has not established feral populations.

6. Provide information on, and the results of any other environmental risk assessments undertaken on the species both in Australia and overseas, including any Import Risk Analyses undertaken by Biosecurity Australia.

7. Assess the likelihood that the species could establish a breeding population in the Australian environment should it ever be released from effective human control. Include at least the following factors:
   - ability to find food sources
   - ability to survive and adapt to different climatic conditions (e.g. temperatures, rainfall patterns)
   - ability to find shelter
   - rate of reproducing
8. Provide a comprehensive assessment of the potential impact of the species should it establish feral population/s in Australia. Include, but do not restrict your assessment to the impact of this species on:
   - any characteristics that the species has which could increase its chance of survival in the Australian environment.
   - similar niche species (i.e. competition with other species for food, shelter etc.)
   - is the species susceptible to, or could transmit any pests or disease
   - probable prey/food sources, including agricultural crops
   - habitat and local environmental conditions
   - any control/eradication programs that could be applied in Australia if the species was released or escaped
   - any characteristic or behaviour of the species which may cause land degradation i.e. soil erosion from hooves, digging
   - any potential threat to humans.

9. What conditions or restrictions, if any, could be applied to the import of the species to reduce any potential for negative environmental impacts (e.g. single sex imports, desexing animal prior to import etc.).

10. Provide a summary of the types of activities that the specimen may be used for if imported into Australia (e.g. pet, commercial, scientific). You must discuss:
    - the benefit of this species for these activities
    - potential trade in the species
    - why this species has been chosen.

11. Provide detailed guidelines on the way in which the species should be kept, transported and disposed of in accordance with the types of activity that the species may be used for if imported into Australia. You must include:
    - the containment (e.g. cage, enclosure) and management standards for this species to prevent escape or release. This should also talk about the security standards for this specimen
    - the disposal options for surplus specimens.

12. Provide information on all other Commonwealth, state and territory legislative controls on the species, including:
    - the species’ current quarantine status, or
    - pest or noxious status, or
    - whether it is prohibited or controlled by permit or licence in any state or territory.