



Secretary: *[Signature]*

RECEIVED

21 MAY 2004

HOUSE OF REPRESENTATIVES
STANDING COMMITTEE ON
AGRICULTURE, FISHERIES
AND FORESTRY

Inquiry into the impact on agriculture of pest animals

House of Representatives
Standing Committee on Agriculture, Fisheries & Forestry

CSIRO submission
21th May 2004

Contact Tony Robinson, CSIRO Sustainable Ecosystems
GPO Box 284, Canberra ACT 2601, ph 02 6242 1676,
E-mail: tony.robinson@csiro.au

Contributors AJ Robinson, M Lonsdale, A Hyatt, R Osborne, G Singleton, L Hinds, K
Williams, J Baxter

Contents

| | |
|--|----------|
| 1. Develop a common policy framework..... | 4 |
| 2. Improve coordination across jurisdictions & between types of invasive species..... | 5 |
| 3. Improved program delivery..... | 6 |
| 3.1 Prevention of the establishment of new pests..... | 7 |
| 3.2 Emergency responses to incursions..... | 7 |
| 3.3 Eradication of existing infestations..... | 7 |
| 3.4 The role of RDCs and industry groups..... | 7 |
| 3.5 Improved engagement and adoption..... | 8 |
| 4. Conclusions..... | 8 |
| Appendix 1..... | 9 |

Structure

CSIRO welcomes the opportunity to provide a submission to the Inquiry into the impact of pest animals on agriculture. The submission that follows outlines CSIRO's suggested approach to more effective management of animal pest issues in Australia and is not structured around the Terms of Reference. Rather, the submission is **structured around the elements of more effective pest animal management policy, strategy and programs, with cross-referencing to the Committee's Terms of Reference included in section headings.**

| Terms of Reference | Relevant Section |
|--|---|
| 1. To identify nationally significant pest animal issues and consider how existing Australian and State government processes can be better linked for more coordinated management of these issues across State boundaries. | Section 2 |
| 2. To consider the approaches to pest animal issues across all relevant jurisdictions, including: <ul style="list-style-type: none"> » prevention of new pest animals becoming established; » detection and reporting systems for new and established pest animals; » eradication of infestations (particularly newly established species <ul style="list-style-type: none"> ▪ or 'sleeper' populations of species which are considered to be high risk) where feasible and appropriate; and « reduction of the impact of established pest animal populations. | Section 1 (policy) and Section 3 (programs) |
| 3. Consider the adequacy of State Government expenditure on pest animal control in the context of other conservation and natural resource management priorities, with particular reference to National Parks. | Not included In this submission |
| 4. Consider the scope for industry groups and R&D Corporations to improve their response to landholder concerns about pest animals. | Section 3.4 |
| 5. Consider ways to promote community understanding of and involvement in pest animals and their management. | Section 3.5 |

Summary

As the only full-time professional research organisation dealing with pests across state boundaries, at large scale and over long time frames, CSIRO research is key to identifying impacts of pests and appropriate methods for their reduction.

Within CSIRO five research Divisions have strong research components related to animal pests affecting agricultural and the fishing industry. These are CSIRO Sustainable Ecosystems (vertebrate pests), CSIRO Entomology (insect pests), CSIRO Marine Research (marine pests), CSIRO Livestock Industries (vertebrate pests) and CSIRO Land and Water (freshwater pests). As well as animal pests, CSIRO Plant Industry, CSIRO Entomology and CSIRO Sustainable Ecosystems are working on a range of plant pests.

Pest animals include introduced vertebrate pests such as rabbits, foxes and mice, overabundant native animals such as kangaroos and invertebrate (insect) pests such as locusts, screwworm fly and strike flies. The cost to Australia's agricultural industries in both lost production and pest control is enormous. For example:

- " Rabbits (\$115M per year in lost wool production)
- « Foxes (\$500M-\$750M per year in control costs)
- " Pigs (>\$100M per year in lost production)
- " Rodents (>\$200M lost production per mouse plague)

The Pest Animal Control CRC, which includes CSIRO as a partner, has recently published a comprehensive study of the impact of animal pests that details the costs to Australia¹.

In addition, Australia's animal pests pose a biosecurity risk, particularly in northern Australia where populations of feral animals may harbour diseases that could harm Australia's agricultural industries and damage our export trade.

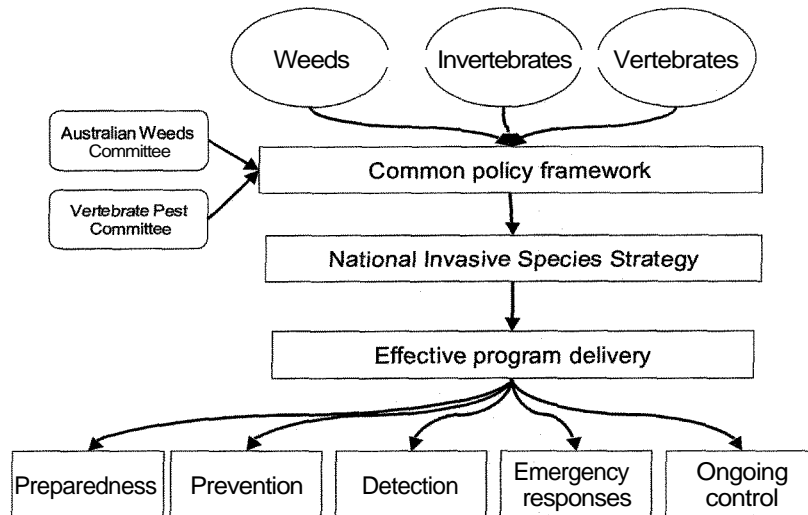
Although not the focus of this enquiry, the environmental costs of pest animals are also significant, in both control and loss of biodiversity values. These costs and impacts are very difficult to separate from those on agricultural production.

CSIRO has a long involvement in the management and control of invasive species in Australia (see Appendix 1) and believes that opportunities exist to maximise the effectiveness of invasive species control through:

- * Development of a common policy framework for dealing with invasive species.
- " Improvement of coordination across jurisdictions between types of invasive species through development of a national invasive species strategy incorporating vertebrate, invertebrate and plant pests.
- " Improved effectiveness of program delivery.

¹ McLeod, R. (2004) *Counting the cost: Impact of invasive animals in Australia 2004*, Pest Animal control CRC, Canberra

The following diagram illustrates the approach we suggest, and further detail of each element is included in the sections that follow.



1. Develop a common policy framework

(Term of Reference 2)

Currently there is no systematic approach to policy formation in response to pest incursions in Australia.

The current drafting of an intergovernmental agreement on the management of marine pest incursions provides a model from which a coordinated response to animal pests might be developed.

Of critical importance to ensure a co-ordinated approach to pest management is the development of a framework that is independent of species. Such a framework should include the following elements:

- Preparedness
- Risk assessment and prevention
- Detection
- " Response

This framework, and variants of it, is starting to appear globally, being both useful for building good practice in invasive species management, and as an assessment tool for potential and emerging pests.

2. Improve coordination across jurisdictions and between types of invasive species

(Term of Reference 1)

Several analyses have been undertaken which identify the significance of animal pests in Australia, to both our agricultural industries and environment. These identify the main vertebrate pests as rabbits, foxes, wild dogs, pigs, rodents, cane toads and carp, with bird pests being a serious and increasing problem, particularly to horticulture².

A range of organisations play a role in facilitating national approaches to vertebrate pest management, including: the Pest Animal Control CRC, Australasian Wildlife Management Society (AWMS³), Australian Wildlife Health Network (AWHN⁴), Bureau of Rural Sciences (within the Department of Agriculture, Fisheries and Forestry⁵), and Department of Environment and Heritage⁶. Biosecurity Australia (DAFF with participation of DEH) plays an important role with respect to assessments for importation of exotic species and entry of pests via trade.

There are some existing mechanisms for coordinated management of vertebrate pest issues across State boundaries. The main government initiative to coordinate pest animal issues on the agricultural side is the Vertebrate Pest Committee (VPC), the members of which constitute representatives of the Federal, State and Territory agricultural agencies as well as CSIRO. The VPC reports to the Primary Industries Standing Committee.

A lack of coordination in invasive species management occurs in two dimensions, both between jurisdictions, and between plants, vertebrate and invertebrate species.

In both cases this lack of coordination limits the effectiveness of management of invasive species, and prevents sharing of approaches and learning.

Despite the multitude of organisations involved in pest management, there is currently no overarching framework or national strategy to provide a common direction, or mechanism for improved coordination between jurisdictions.

Currently the management and policy development regarding animal pests is separate to that for weeds and other invasive species. The mechanism for dealing with incursions is also separated into the Australian Weeds Committee and the Vertebrate Pest Committee and although these committees work well, there is a lack of ready response for invertebrates as they are not included. Possible approaches may include an Invertebrate Pests Committee under the Natural Resource Management Ministerial Council (NRMMC) analogous to the VPC, or restructuring of the current committees to include invertebrate pests.

Invasive species experts overseas envy the National Weed Strategy and Australia's tight biosecurity border controls. Nevertheless, whilst we have measures in place at the border and to deal with major individual species, insufficient national effort is targeted at the *emerging* problem species. Currently we deal with incoming pests and well-established pests, but not with emerging pests that are currently in the country

² Mary Bomford, 2003. Risk assessment for the import and keeping of exotic vertebrates in Australia http://www.affa.gov.au/corporate_docs/publications/pdf/rural_science/lms/ferals/risk_assess_book.pdf

³ <http://www.awms.org.nz>

⁴ www.fauna.org.au/Downloads/AWHN%20Brochure.pdf

⁵ www.daff.gov.au

⁶ www.deh.gov.au

and have potential to cause major impact to our agricultural industries and the environment.

The need to identify "sleeper" species is essential due to the difficulty and unrealistic expectations of eradicating species once they are identified as pests. BRS provides an excellent discussion of when eradication is a feasible and appropriate goal .

Vertebrate pests that are "sleepers" in Australia in regard to their current and potential impact are:

- the ferret (a pest of significance to the conservation status of many native birds in New Zealand);
- " various deer species (impact on forestry);
- « the black rat (recent report of a second species in Queensland; increasing its geographic range; establishing itself as a significant pest of orchards; also carrier of significant human diseases such as leptospirosis, typhus and lungworm); and
- " the red fox in tropical Australia and in Tasmania.

These are species that have recently come to our attention; it is by no means an exhaustive list. Illegally imported species (for example snakes, lizards, amphibians and birds) are a danger as sleeper species, whether or not they have escaped captivity, because their potential for causing harm as pests or as disease vectors.

CSIRO believes the development of a **national invasive species strategy** should be considered. The strategy:

1. could incorporate the National Weed Strategy (NWS)⁸, as there are many learnings and insights gained already from the NWS that could be more broadly applied to invasive species;
2. would recognize that invasive species are a multi-sectoral problem; and
3. would seek to adapt and apply knowledge gained in managing agricultural invasive species organisms to environmental pests (an approach that is already improving management of the Weeds of National Significance).

More detail of such a strategy, and its incorporation of both agricultural and environmental issues are available in our submission to the Senate Inquiry into the regulation, control and management of invasive species and the Environment Protection and Biodiversity Conservation Amendment (Invasive Species) Bill 2002⁹.

3. Improved program delivery

(Term of Reference 2)

The development of a national strategy for invasive species, and a common framework for policy development would facilitate more effective program delivery in pest management.

There is a need to develop effective program delivery that differentiates between local and national issues, and recognises the variety of responses that are required to

⁷ Mary Bomford, 2003. Risk assessment for the import and keeping of exotic vertebrates in Australia http://www.affa.gov.au/corporate_docs/publications/pdf/rural_science/lms/ferals/risk_assess_book.pdf

⁸ http://www.mincos.gov.au/pdf/nat_weeds_strategy.pdf

⁹ http://www.apb.gov.au/Senate/committee/ecita_ctte/invasive_species/submissions/sub34.doc

manage animal pests. The policy framework advocated in this submission allows for the development of program responses that deal with preparedness, risk assessment and prevention, detection and response

3.1 Prevention of the establishment of new pests

Invasive species experts overseas envy the National Weed Strategy, and Australia's tight biosecurity border controls. Nevertheless, whilst we have measures in place at the border and to deal with major individual species, insufficient national effort is targeted at the *emerging* problem species. Funding for the management of invasive species affecting the environment is also less than is needed, and is inappropriate in its manner of delivery, via the NHT, in annual allocations that do not allow long-term strategic control measures to be planned. In addition, the next generation of invasive species may well depend on the dynamics of such factors as climate change and trade, and consequently we must ensure that our control measures take account of such potential risks.

3.2 Emergency responses to incursions

Australia's ability to respond rapidly and appropriately to animal pest incursions is currently lacking. Processes are currently sketchy and reaction times often too slow. An example is the lag time between reported presence of foxes in Tasmania and the development of detection and reporting systems. A clear coordinated process that works across jurisdictions is required.

Emergency response to new marine invasions provides a model of such a coordinated process. This is handled through the Consultative Committee on Introduced Marine Pest Emergencies, chaired by DAFF. This committee has members from all States/NT, DAFF, DEH and CSIRO. The committee can call on funds of up to \$5 million if members agree that an eradication program is feasible and necessary. The committee has addressed seven emergencies since its start in 2000, and is based on the animal disease model.

3.3 Eradication of existing infestations

Programs supporting the eradication of existing infestations of pests need to recognise that both short-term, localised and longer-term strategic approaches are required. There is currently limited capacity for agricultural industries to deal with these longer-term considerations.

Localised pest control methods are often effective, although they are usually labour intensive and repetitive. Consequently, at the landscape scale this type of control is often too patchy and short-term to provide sustained benefits.

Larger scale problems can be made more manageable and cheaper to deal with through the introduction of biological controls. Although an ideal means of control, the introduction of biological agents can be achieved only after long-term research. Nevertheless, the benefits of such programs are very likely to exceed costs where infestations are extensive.

3.4 The role of RDCs and industry groups (Term of Reference 4)

Some of the rural industries lack the critical mass to thoroughly formulate strategies or invest in significant R&D aimed at addressing pest incursion issues. However, some industry groups and R&D Corporations are active in this area. Plant Health Australia (PHA) is involved in the formulation of emergency plant pest responses and

also produce specific industry based Biosecurity plans (eg. for the Citrus industry). The Grains Research and Development Corporation (GRDC) have also recently backed an Invertebrate Biosecurity initiative with CSIRO Entomology, and have invested in CSIRO's strategic research into the immunocontraception of house mice.

In order that program development for invasive species is more effective, it needs to be conducted in partnership with Australia's agricultural industries. By working in partnership, solutions can be developed which are in line with industry biosecurity plans. This will ensure engagement with the industry and good uptake.

3.5 Improved engagement and adoption (Term of Reference 5)

Various organisations involved in pest management in Australia are working to promote community understanding, including state and federal agencies as well as industry bodies and RDCs. Steady progress has been made in raising awareness in the general community about the impact of invasive species on our industries and our environment.

As mentioned above, involvement and engagement is essential to change behaviour and effect change. There is a need to recognise that human behaviour is the key to effective invasive species management, with problems often being exacerbated and programs defeated by human actions or inactions. Thus, any programs which are developed need to consider the human element in their delivery and focus on delivery and communication methods that facilitate adoption and uptake.

4. Conclusions

Whilst substantial effort is being made across Australia's jurisdictions to control animal pests, the return on effort is currently limited by a lack of coordination, and the absence of an overarching strategy.

A common policy **framework** is required for dealing with invasive species across the spectrum, from prevention through rapid response to new incursions to long-term control and eradication.

A national strategy for invasive species should be developed to reflect this policy framework, incorporating weeds, invertebrates and vertebrate pests.

At the moment the national effort in pest control is bifurcated - we deal with incoming pests, and with well established major pests, but have no strategy in place to deal with emerging pests - those already here that are not yet having a major impact. We need a strategy to deal with these "sleeper" species.

Research and development are needed

- to develop new cost effective control measures for major pest problems;
- to support rapid identification/diagnostic systems; and
- to build risk assessment systems able to prioritise among a range of incoming and emerging problems.

Program development under such a strategy needs to recognise the need for co-ordinated rapid response to incursion, short-term local control measures and longer-term strategic control at a landscape and national scale.

Appendix 1 CSIRO R&D for invasive species control and management

As the only full-time professional research organisation dealing with pests across state boundaries, at large scale and over long time frames, CSIRO research is key to identifying impacts of pests and appropriate methods for their reduction. Partnership with others is essential to CSIRO's research to develop both long-term, national scale invasive species solutions and short-term, more localised management solutions.

Box 1- Pre-emptive control case study: biocontrol of banana skipper (*Erionota thrax*) in Papua New Guinea to protect Australia

The banana skipper butterfly, a native of Southeast Asia, became a major pest of bananas in Papua New Guinea (PNG) in the 1980s. It is capable of destroying, on average, 60% of banana leaves, leading to a prediction that, had the pest not been brought under control following introduction of a biological control agent in the late 1980s, production losses by 2020 would have totalled A\$302 million.

There is good reason to believe that banana skipper could cause losses of even greater magnitude in Australia's banana industry. However the threat once posed by significant populations of the pest in PNG has now largely been removed as a result of the biological control program. Benefits deriving to Australia from this pre-emptive strike, projected over a 25 year period from 1995, have been estimated at A\$988 million. These estimates are based on the assumption that banana skipper would have arrived on the Australian mainland in 1995 had the PNG population not been controlled.

It could be argued that the Australian research that led to control of banana skipper in PNG could have been delayed until such time as the pest was detected in Australia. This would have been a false economy. As previously indicated, by controlling the pest on our doorstep we have significantly reduced the risk of an incursion reaching Australia. Had this step not been taken and an incursion eventuated, the costs of eradicating the pest (if indeed it was feasible to do so) would be much greater than the A\$0.7 million that it cost to implement biological control in PNG. There would have been inevitable delays in getting permission to introduce biological control agents to Australia and further delays whilst the agent(s) were being evaluated and mass reared for release. It is reasonable to expect an interval of 18-24 months between detection of an incursion and release of the first agents. In the meantime, the pest would have infested a much larger area, given its ability to spread at a rate of up to 500 km/year, by which time eradication may well have been unachievable.

As well as the introduction of successful biological controls such as rabbit calici virus there are many examples of less publicised incremental improvements in pest management based on CSIRO's research. This usually involves research into the understanding of the basic biology of the pest in its home range and in its new environment so that weaknesses can be identified and exploited. Mouse, fox, rabbit, pig, and wild dog control all rely on an understanding of their behaviour in the Australian environment and the judicious use of control methods, much of it the result of CSIRO's research effort often in partnership with State agencies, universities and landholders.

This long tradition of pest control is being continued to this day. Within CSIRO five research Divisions have strong research components related to animal pests affecting agricultural and the fishing industry. These are CSIRO Sustainable Ecosystems (vertebrate pests), CSIRO Entomology (insect pests), CSIRO Marine Research (marine pests), CSIRO Livestock Industries (vertebrate pests) and CSIRO Land and Water (freshwater pests). As well as animal pests, CSIRO Plant Industry, CSIRO Entomology and CSIRO Sustainable Ecosystems are working on a range of plant pests.

Box 2 Eradication case study: The Black-Striped Mussel Invasion of Darwin Marinas 1999

The fouling mussel, *Mytilopsis* sp., colloquially known as the black-striped mussel was discovered in March 1999, in a Darwin marina at densities up to 23,650 mussels per m² during an opportunistic port survey. It had reached those densities in less than 6 months. This mussel is a fast growing filter-feeder that clings to boats and pilings and has the capacity to jam water intake pipes. It is closely related to the freshwater zebra mussel that costs the United States \$100 million a year to control in the Great Lakes alone, and that is implicated in the growing death in those lakes between spring and autumn. The zebra mussel is now spreading rapidly throughout the contiguous US, with continually escalating economic and environmental costs.

The Northern Territory government reacted rapidly to quarantine the infected area within three days of being informed by CSIRO of the presence of the black striped mussel in a Darwin marina. It was later found in a second marina and had a high probability of infecting a third marina. The mussel was seen as a major environmental and economic threat to the Northern Australian coastline (between Sydney to Perth) and also a major threat to the local \$40 million per year pearl oyster fishery.

Over the next 30 days, the Northern Territory Government led an impressive eradication campaign that ended up involving over 260 people, used 187 tonnes of sodium chloride and 7.5 tonnes of copper sulphate, and costed over \$2 million in materials alone. This was the first eradication of an established marine pest in the world. It led directly to the 1999 Taskforce Report on the Prevention and Management of Marine Pest Incursions, that has led to the proposed National System for Prevention and Management of Marine Pest Incursions.

Currently CSIRO is involved in a range of research and development for invasive animal control that includes:

- " development of biological control methods for vertebrate pests such as rabbits, foxes, cane toads, mice and carp;
- " improved management of rodent pests in Southeast Asia;
- " population modelling and epidemiology of vertebrate pests;
- " integrated pest management for cotton;
- genetic control of insect pests;
- " management strategies for control of pasture and field crop (insect) pests such as aphids and red legged earth mites;
- development of biologically based products to replace chemical pesticides in horticulture;
- biological, engineering and chemical approaches to protection of stored products; and
- " biology and management of termites.

The examples included here illustrate the importance of our linkages with both other research agencies and those involved in on-ground pest management to facilitate successful pest control measures. In all cases, partnership and uptake are the key to successful research.