



Pet Biosecurity in New Zealand

Current state of the domestic pet trade system and
options going forward

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Overview

Pet¹ ownership is an important part of New Zealand culture, with pets in 68 percent of households. The total pet population is approximately 5 million, comprising a wide range of species (MacKay 2011).

Despite the socio-economic benefits of the pet industry, pet escapes and releases are globally recognised as an important pathway for new bioinvasions. New Zealand's island ecology is vulnerable, and bioinvasions continue to have significant impact.

While the majority of pet traders and owners act responsibly towards their pets and our environment, inevitably some pets are abandoned, released or escape. If they establish feral populations, they could become pests or spread disease. Further risk is identified in the import and domestic trade of illegal species.

Scope exists to improve knowledge regarding which species may be legally kept and traded in New Zealand. Uncertainty in this area exists in respect to “new organisms” legislation for those species not present in New Zealand immediately before 29 July 1998. This is not conclusively known for some species although attempts are now being made to develop definitive lists. Further uncertainty may arise as a result of variations in pest classifications and rules between regional pest management strategies.

The relative biosecurity risks posed by different pet species are identified as an important knowledge gap. Some pet species, while legally kept and traded, may nevertheless pose a biosecurity risk. There may be opportunities to better manage such species using both regulatory and non-regulatory tools. Currently there are limited regulatory controls surrounding the possession or domestic trade of pet species. Non-regulatory approaches to reducing the frequency of abandonment, release and escape events may be particularly useful.

There exists an element of trade in illegal² species. While the scale of this activity is uncertain, regulatory intervention is likely to remain the primary disincentive. There may be an opportunity to apply non-regulatory tools to the demand side of the market (e.g. awareness/education, trader certification) to further reduce the scale of illegal activity.

From an international perspective, it is acknowledged that the New Zealand pet trade is comparatively well managed already. Many exotic pet species troublesome elsewhere in the world are not present in New Zealand, a favourable legacy of stringent border control systems. Biosecurity incidents nevertheless occur from time to time. While the frequency of such incidents may be low, the consequences can be significant given the low tolerance of the New Zealand environment to bioinvasions and consequential impacts on socio-cultural, economic and human health values.

¹ The interpretation of “pet” for the purposes of this report is any animal kept for the purpose of companionship, interest, or amusement.

² Illegally kept or traded species include species which are subject to one or more of the Hazardous Substances and New Organisms Act 1996 (with respect to ‘new organisms’, and any species listed in schedule 2 of that Act), the Biosecurity Act 1993 (with respect to “unwanted organisms”, or “pests” declared under national or regional pest management strategy), and the Trade in Endangered Species Act 1989.

Introduction

This report attempts to describe the pet trade “system” in New Zealand. It outlines the dynamics of the current state and the associated biosecurity risks. In doing so, it identifies the knowledge gaps, risks, key drivers, and considers the opportunities available and the challenges ahead in working towards a desired future state. This information may be used to help determine how best to manage biosecurity risks associated with the domestic pet trade.

This document relies on the input of workshop participants and discussion with other participants (Appendix 2). Further reliance is placed on published material as referenced.

While this report may contribute to policy development, it should not be construed to comprise formal policy direction. Also, the views expressed in this report do not necessarily represent those of any contributors or participating agencies.

The definition of “pet” used in this report is any animal kept for the purpose of companionship, interest or amusement. Cats, dogs, livestock, native animals and animals only held in approved containment facilities (e.g. zoos, wildlife parks, etc) are not included in the scope of this report. Whilst the capacity to implement the present regulatory system may be constrained by resourcing issues, this is also considered outside the scope of this report and is not further addressed.

At the time of writing this report, a concurrent project is commissioned which attempts to resolve uncertainty with respect to which species exist in the New Zealand pet trade and undertake risk assessment of those species.

Does the domestic pet trade pose biosecurity risk?

Invasive species are considered one of the leading threats to biodiversity globally³. Pet escapes and deliberate releases are a proven source of invasive species into the wild⁴. Once pet species establish feral populations they can become pests, leading to adverse impacts on the environment, native wildlife (through competition, predation and disease transmission), industry sectors such as agriculture and horticulture, and our way of life.

Examples of pet species which have established in New Zealand include eastern rosella parakeet, rainbow lorikeet, sulphur-crested cockatoo, koi carp and goldfish. As certain species fall out of favour within the trade they may be found in the wild in increasing numbers, such as red-eared slider turtles. Some of these species are variably managed as pests by regional government via their respective regional pest management strategies. Other species, such as the rainbow lorikeet, are elevated for management at a national level by central government (Case study 1, Appendix 1).

³ Secretariat of the Convention on Biological Diversity (2010). *Pets, Aquarium, and Terrarium Species: Best Practices for Addressing Risks to Biodiversity*. Montreal, SCBD, Technical Series No. 48, 45 pages. Page 8. “Invasive alien species are a direct driver of biodiversity loss, and considered a cross-cutting issue of the CBD, a key matter of relevance to all major biomes. In addition, invasive alien species have been estimated to cost our economies hundreds of billions of dollars each year, due to both the economic implications of present invasions to agriculture and ecosystem services, as well as the high cost of eradication efforts. At the same time, the pet trade has the potential to generate significant socio-economic benefits, including benefits for developing states.”

⁴ E.g. <http://www.livescience.com/16204-florida-invasive-reptiles-amphibians.html>

In addition to the pet animals, “hitchhiker” species associated with them also pose a biosecurity risk. These can be organisms such as pathogens, parasites and plants associated with pet species. Significant examples of disease transmission include chytrid fungus which has affected native frog populations (Case study 2, Appendix 1), and psittacine beak and feather disease (PBFD) which has been confirmed in a native population of kakariki (red-crowned parakeets) on Hauturu, Little Barrier Island (Case study 3, Appendix 1). Furthermore, the majority of aquatic invasive plants in South Africa, the USA and New Zealand have been introduced via the aquarium trade as ornamental and/or aquarium plants (Martin and Coetzee 2011). Biosecurity risks exist when any animal is transferred from captivity into the environment, irrespective of whether that species of animal is directly able to establish a feral population.

While potential biosecurity risks are realised when animals escape from captivity or are released into the environment, contributory risk factors are also identified within the nature and management of pets within the domestic trade.

The trend towards increased online trading, both internationally and domestically, is recognised as one of the major wildlife conservation challenges of present times (Derraik and Phillips 2010). These authors present a range of examples to highlight the importance to New Zealand of the issue of biosecurity threats associated with online trade (Case study 4, Appendix 1).

Ongoing management of the pet trade system is further complicated by a degree of uncertainty around which species are currently kept as pets in New Zealand, which species are legally able to be kept and traded⁵, and which of those species pose a biosecurity risk. The Environmental Protection Authority (EPA) faces uncertainty when the pet trade sector requires determination of whether a species is a “new organism” or not. Variation in the management approach taken by national and regional authorities can create further confusion within the pet trade sector.

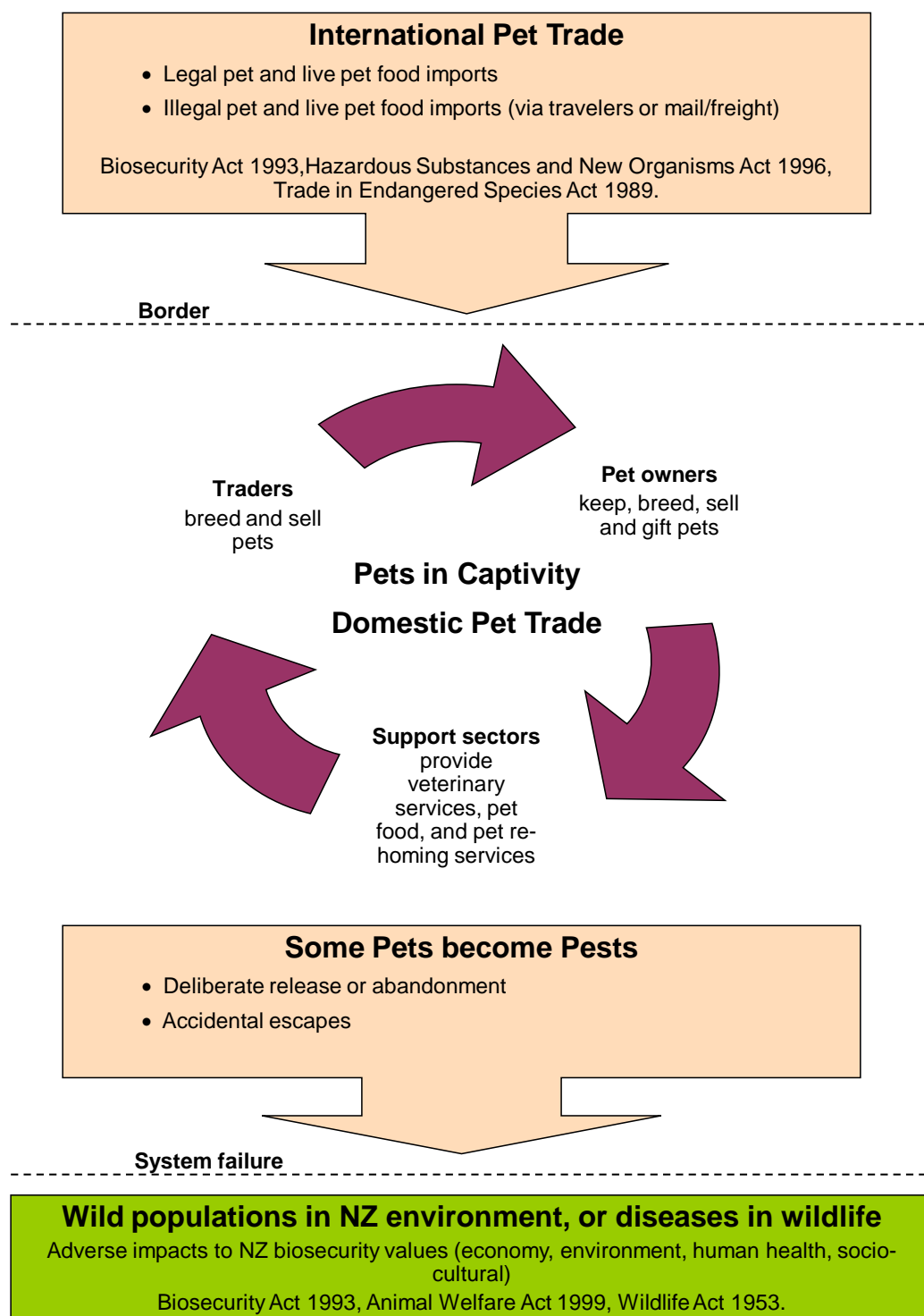
⁵ Illegally kept or traded species include species which are subject to one or more of the Hazardous Substances and New Organisms Act 1996 (with respect to “new organisms”, and any species listed in schedule 2 of that Act), the Biosecurity Act 1993 (with respect to “unwanted organisms” or “pests” declared under national or regional pest management strategy), and the Trade in Endangered Species Act 1989.

The pet trade system

OVERVIEW OF THE PET TRADE SYSTEM

Figure 1 below provides the broad context to the following current state discussion.

Figure 1 – Overview of the pet trade system



CURRENT STATE – DYNAMICS, RISKS AND DRIVERS

The regulatory environment at the border

Whilst the focus of this report is on the domestic pet trade, the international trade is relevant to the domestic pet trade in that it supplies new animals onto the domestic market.

New Zealand exhibits a closely regulated border control system, with relatively few sanctioned transfers of live animals (including pets and pet food species). The mainstay of New Zealand's border control system is the Biosecurity Act 1993 (Biosecurity Act). Effectively any organism that is not subject to an Import Health Standard (IHS) under this Act will not be cleared for entry into the country. Currently, very few IHSs are in place for pet species. Only ornamental fish, chinchilla's, guinea pigs, domestic rabbits, cats and dogs⁶ are legally able to be imported in accordance with their IHS.

Further restrictions on animal imports are imposed under the Hazardous Substances and New Organisms Act 1996 (HSNO Act). The HSNO Act expressly prohibits import of species listed in Schedule 2, as well as any unapproved "new organisms". A new organism is any species not present in New Zealand immediately prior to 29 July 1998. The application process for approving new organisms is expensive and in many instances unlikely to be successful given that the EPA is required to take a precautionary approach. The barrier that the new organism application process effectively poses is demonstrated by the fact that no new vertebrate species have been approved for general clearance since 1998⁷.

The Trade in Endangered Species Act 1989⁸ (TIES Act) also prohibits unapproved import or trade of scheduled endangered species.

Border control measures cannot prevent all illegal organism imports. Smuggling does occur, particularly of birds and reptiles, with anecdotal and informant information indicating that an unknown number of illegal importations are not detected by border authorities⁹. In the last century, over 50 species of exotic reptiles have been intercepted at New Zealand's borders including over 700 individual specimens for a six-year period between 2004 and 2010 (Kikillus 2010). No information is available to distinguish how many of these events were unintentional (e.g. reptile stowaways in goods), versus illegal smuggling attempts. Concern has been expressed that enforcement capacity may be insufficient with regard to wildlife smuggling, with just three Wildlife Enforcement Officers employed in New Zealand.

Motivating drivers of illegal import of pet species might include;

- **Financial gain.** Some pet species are valuable. The risk of engaging in illegal activity may be worth taking for some individuals who perceive there is a low probability of being detected, together with potential for profit exceeding the penalties typically applied by the Courts where offenders are successfully prosecuted¹⁰.

⁶ Cats and dogs may be imported by their owners. These species are outside the scope of this report.

⁷ Dr G Ridley, Environmental Protection Authority, pers comm.

⁸ This Act aims to implement New Zealand's obligations under the Convention on International Trade in Endangered Species of Wild Fauna and Flora 1973 (CITES).

⁹ A Panaho, MPI Wildlife Enforcement Group, pers comm.

¹⁰ A Panaho, MPI Wildlife Enforcement Group, pers comm.

- **Genetic vigour.** Some pet species have limited population size (or had a limited founding population) in New Zealand and may experience inbreeding problems through limited bloodlines. As no IHS exists for most pet species, it is not possible to legally import new breeding stock.
- **New species.** Some individuals may desire a pet species which is not otherwise available in New Zealand.
- **Immigration.** Immigrants may wish to bring their pets with them, and this is not legally possible if no IHS exists for their species of pet.
- **IHS process.** The lack of IHSs for a number of pet species and the perceived length of time and costs involved in formally applying for an IHS may be a significant driver for the deliberate and illegal smuggling of certain pet species across the border.

Regarding additions to the domestic pet trade from international sources, three categories of organisms are identified.

1. Legally imported pet animals which legitimately become established in the domestic pet trade.
2. Illegally imported animals which are “new organisms” (HSNO Act). New organisms, and any persons possessing them, remain subject to intervention by MPI¹¹. The White’s tree frog response (Case study 5, Appendix 1) demonstrates the effectiveness of the HSNO legislation when new organisms unexpectedly appear in the country. Implementation of the HSNO Act can be compromised if it is uncertain whether a species is a new organism or not. Leopard gecko and blue tongue skink are two examples of possibly “new” pet species which have appeared on the domestic market¹². Due to uncertainty as to whether these species were new organisms or not, no regulatory action has been taken to date, and consequently these species are perceived to be legally able to be traded.
3. Illegally imported animal species which are already present in New Zealand (i.e. not new organisms). Once these smuggled animals establish in the domestic pet trade, they cannot be readily distinguished from those that were already present.

The regulatory environment in the domestic trade

The biosecurity risk of the domestic pet trade is regulated primarily via the Biosecurity Act, with further general provisions relating to the abandonment of animals in the Animal Welfare Act 1999.

The Biosecurity Act provides for the exclusion, eradication and effective management of pests and unwanted organisms. Particular species of concern may be declared an unwanted organism¹³ by a Chief Technical Officer, or a pest under a national or regional pest management strategy. Any pest or unwanted organism may not be released, spread, bred, multiplied, sold, offered for sale, communicated or exhibited¹⁴. Pests may be subject to further rules in pest management strategies. Currently, variation exists between regional pest management strategies with regard to which species are classified as pests, and the rules that

¹¹ MPI is the lead enforcement agency with respect to HSNO legislation.

¹² J Kneegmans, MPI.

¹³ Refer to the unwanted organisms register: <http://www.biosecurity.govt.nz/pests/registers/uor>

¹⁴ Sections 52 and 53 Biosecurity Act 1993. Flexibility by way of exemptions is possible.

apply. For instance, while most regional pest management strategies in New Zealand do not include chinchillas, this species is closely regulated in the Southland region where they may not be kept or traded without a permit from the regional council. This is just one example of the kind of variability which can cause confusion for traders.

While any species can potentially be classified as an unwanted organism or declared a pest subject to statutory tests, most pet species may be kept, bred and traded without restriction. A perception has been expressed that current implementation of domestic regulation may not be adequately addressing the risks posed by some pet species. The New Zealand Herpetological Society (NZHS) recently conducted a survey among its members, with 68 percent of respondents expressing that permits should be required for all reptiles in captive facilities, rather than only for native reptiles, given the biosecurity risk posed by exotic reptiles¹⁵. Reptiles are popular pets in New Zealand with at least 10 exotic species legally kept in captivity (Kikillus 2010).

The Animal Welfare Act¹⁶ provides regulation across the domestic pet trade with respect to the release and desertion of animals without appropriate care or shelter¹⁷. However, this Animal Welfare Act provision does not apply if the released animal adapts and thrives in its wild environment. These animals that adapt to their new environment are more likely to establish feral populations, and therefore comprise significant biosecurity risk.

If a species were to establish a feral population that population is automatically protected under section 3 of the Wildlife Act 1953. This default protection can be removed either by the addition of that species to schedule 5 of the Wildlife Act, or by classifying that species as an unwanted organism under the Biosecurity Act. The default protection provided by the Wildlife Act creates a hurdle to the effective management of biosecurity risk posed by new populations of animals founded from captivity. For example, rainbow skinks established populations in the wild, and were subsequently classified as unwanted organisms and were included in schedule 5 of the Wildlife Act at a later date¹⁸.

In summary, key risks and gaps identified in respect of the regulatory system are as follows.

- While border control legislation is comprehensive, enforcement resources are necessarily finite. Some animals enter the country illegally, and there may be insufficient capacity to deal with new organisms “appearing” domestically.
- The absence of IHSs for many species otherwise able to be legally kept and traded in New Zealand may contribute to activities involving the illegal import of animals.
- Responding to “new organisms” is compromised by uncertainty as to whether or not a species was present in New Zealand prior to 29 July 1998.
- While the Biosecurity Act provides scope to classify risk species as unwanted organisms or pests, there is no legislation in place to address the systemic risk associated with the transfer of pet animals into the environment, together with their associated hitchhiker organisms and diseases.
- Uncertainty exists within the pet trade sector as to which species may be legally traded.

¹⁵ Jill Hingston, President, New Zealand Herpetological Society. pers comm.

¹⁶ Section 14(2) of the Animal Welfare Act 1999 provides;

(2) A person commits an offence who, being the owner of, or person in charge of, an animal, without reasonable excuse, deserts the animal in circumstances in which no provision is made to meet its physical, health, and behavioural needs.

¹⁷ Some further restriction apply with respect to release onto conservation lands.

¹⁸ J Kneegmans pers comm.

Dynamics of the domestic pet trade

As legal pet imports for most species are infrequent due to the absence of IHSs, the domestic pet trade is a relatively closed system. The main exception is the ornamental fish sector, where a significant proportion of stock is legally imported subject to the IHS.

The key domestic stakeholders are:

- **Traders.** The pet industry including importers, breeders, pet shops, private and internet traders.
- **Pet owners.** Owners keep, breed and gift pets (some sales/transfers also occur between pet owners, so the distinction between owners and traders is somewhat blurred).
- **Support sector.** Such as veterinarians, pet food and pet care product manufacturers, pet welfare agencies, re-homing and adoption groups, and pet boarding/care facilities.

Traders and pet owners breed pets, and transfer them between one another and themselves, and in any direction (e.g. a pet initially purchased from a pet store may be returned there when it, or its progeny, is no longer wanted). While the various transfer pathways cannot be quantified, it is possible to broadly estimate the approximate size and nature of the domestic pet trade.

New Zealand has one of the highest pet ownership rates in the world, with an estimated 5 million pet animals in 68 percent of New Zealand households. Total expenditure is around \$1.25 billion per year, of which half comprises pet food expenditure, and 90 percent overall is spent on cats and dogs (Mackay 2011). While cats, dogs, horses and ponies are outside the scope of this report, the data are included here for comparative purposes and indicate that more than \$10 million is spent on fish, birds, rabbits and other species within the scope of this report.

Figure 2 shows the breakdown of pet type. Of the 5 million total pets, fish (1.7 million) and birds (527,000) fall within the scope of this report. Another 446,000 pets are classified as “other”, and will include some other pet species also within the scope of this report (e.g. amphibians, reptiles, some mammals and insects).

Figure 2 – Pet types in New Zealand households (from McKay 2011)

New Zealand Companion Animal Population Breakdown, 2011			
Companion Animal Type	Household penetration	Average number in home	Total (000's)
Cats	48%	1.8	1.419
Dogs	29%	1.5	700
Fish	11%	9.1	1,678
Birds	6%	4.9	527
Rabbits	3%	1.7	88
Horses/ponies	2%	3.2	87
Other	5%	4.9	446
None	32%	~	~
Total	68%		4.945

Source: Galaxy Research, 2011

Pet owners source their pets from a range of sources as shown in figure 3. No data is shown for “other” pets which would include reptiles and amphibians, while the data for fish, birds and rabbits are variable with respect to acquisitions via “traders” as approximated by pet shop and breeder categories.

Within the traders sector, it is estimated that approximately 40 percent of participants hold some form of industry membership¹⁹, such as with the Pet Industry Association or the Companion Animal Council, with remaining breeders and traders operating independently.

Figure 3 – Supply trends in the domestic pet trade (from McKay 2011)

Where Companion Animals are Sourced from						
Source	Cats	Dogs	Fish	Birds	Rabbits	Pony/ Horse
Pet shop	13%	11%	71%	41%	27%	~
Breeder	8%	43%	8%	31%	28%	28%
SPCA/animal shelter	27%	13%	1%	3%	6%	3%
Friend/Neighbour	31%	24%	16%	26%	22%	27%
Found/Stray	19%	3%	1%	7%	6%	4%
Inherited	9%	6%	10%	4%	6%	20%
Vet	3%	1%	2%	3%	2%	~
Other	10%	14%	4%	12%	10%	43%

Note: Figures will not total 100% because households that have two or more of a type of pet may have sourced them from different places.

Note: Where ‘~’ is used there were no responses for this option. ‘0%’ represents a very low number of responses that on rounding round to ‘0’.

Source: Galaxy Research, 2011

Online trade of pets in New Zealand is predominantly via the Trade Me website. Figure 4 presents the 2011 sale statistics, which reveals more than 66,000 trade listings involving pet species within the scope of this report. There is no additional information available to

¹⁹ D Cooper, Companion Animal Council, pers com.

estimate the average number of animals per completed trade. Further, while auctions reflect a completed trade, “classified” listings are also included and these do not always result in a trade. The data does not include species specific level of information.

Figure 4 – Pet transactions via Trade Me for 2011

Month (2011)	Fish	Mice & rodents	Reptiles & turtles	Birds	Rabbits & Guinea pigs	Total
Jan	2061	246	443	632	389	3771
Feb	1933	216	291	519	274	3233
Mar	2110	223	296	480	334	3443
Apr	1880	250	278	426	276	3110
May	2037	239	283	436	302	3297
Jun	1963	282	290	354	278	3167
Jul	2189	286	225	347	292	3339
Aug	2051	267	254	478	348	3398
Sep	2090	241	234	455	352	3372
Oct	2337	202	222	535	392	3688
Nov	2348	241	232	598	475	3894
Dec	1922	240	290	630	449	3531
Total	24921	2933	3338	5890	4161	41,243

Data provided to MPI February 2012 by Trade Me.

There has been a trend to increased online trading (Derraik and Phillips 2010). For example, of the estimated 300 bird breeders in New Zealand, an increasing number are taking advantage of the online trade avenue to sell direct to the public²⁰.

Further to commercial and online trade, there is an unknown level of private trade which does not rely on any publicly visible advertising. This element of the domestic pet trade is likely to include trade in illegal species.

Failure of the domestic pet trade

Whether the transfer of animals, and/or associated organisms or diseases, from captivity into the wider New Zealand environment is through deliberate release, abandonment or escape, these events may occur for various reasons, including:

- ***Change in personal circumstances.*** This may include any of a wide range of changes in the circumstances of the pet owner, such as children leaving home, poor health, old age, financial problems, moving house, new job, new relationship etc.
- ***Change in pet desirability.*** The initial appeal of a chosen pet may wear off over time. Some pet species may grow too large or be too long lived, noisy, costly, care intensive, aggressive etc.
- ***Excess pet progeny.*** Breeding may result in more pet animals than the pet owner wishes to care for.
- ***Cultural.*** Individuals from some cultures may choose to release pet animals for religious, spiritual, or cultural reasons. There is an increasing cultural diversity in New Zealand through immigration in recent years.

²⁰ M-L Slone pers com.

- ***Aesthetic.*** Pet owners may perceive it desirable to add further diversity to New Zealand's existing wildlife.
- ***Pet freedom.*** Pet owners may release pets into the wild on the principle of giving the animal "freedom". This principle also applies where pet animals are given an abundance of space in either a semi-contained or uncontained environment, giving rise to a higher probability of escape.
- ***Substandard containment facility.*** Pet escapes may occur unintentionally due to human error, or where containment facilities are insufficient²¹.
- ***No market demand.*** The demand and value of pet species may reduce due to an over supply on the market or a change in trend.

Although the relative influence of the above drivers are not known with any certainty, it seems likely that the main driver for deliberate release and abandonment of pets occurs when they are no longer wanted, while most escapes may be facilitated by insufficient containment facilities.

Having considered drivers for release and abandonment, a further question arises why alternative means of pet disposal are not selected. Contributory factors in this respect include:

- ***Convenience.*** Release or abandonment may be the simplest and cheapest option.
- ***Not fully aware of biosecurity risks.*** Limited knowledge of the potential biosecurity implications of pet releases with respect to environmental, economic, human health and socio-cultural values. Lack of communication as to those biosecurity risks.
- ***Not fully aware of welfare consequences.*** Limited knowledge of the potential welfare implications of pet releases. Most pets will suffer outside captivity.
- ***Not aware of alternative means of disposal.*** Such as regional council²² and other pet re-homing services, rescue organisations, pet shops, sale, gifting, pets for adoption (www.petsonthenet.co.nz) etc.
- ***Concern that pets may be euthanised.*** Consider that it is better that the animal is released and given "a chance at life", than killed when no longer wanted.

In summary, the following key risks are identified in respect of the domestic pet trade system in addition to the regulatory risks previously identified;

- Some pet owners transfer their pets from captivity into the environment, either deliberately or accidentally, and for a wide range of reasons.
- Alternative means of disposing of unwanted pets may not be selected due to a lack of awareness of biosecurity risk and animal welfare, together with a lack of awareness of viable alternatives.
- Trade in illegal species continues to occur, driven partly by a lack of certainty as to which species may be legally traded, and partly motivated by opportunity for profit.

²¹ On 15 January 2012, there were 362 pets reported lost throughout New Zealand on www.petsonthenet.co.nz.

²² For example Auckland Regional Council offers an unwanted pet reptile and bird relocation service. J Crow per comm..

A DESIRABLE FUTURE STATE OF THE PET TRADE SYSTEM

A desirable future state²³ of the pet trade system, over the next 10 years, might be as follows.

All trade in high risk species is reduced and trade in illegal species is prevented through education to lower demand, reporting by all participants and by enforcement, whilst:

- a range of pet species remains available to New Zealanders;
- pet owners and traders exhibit a culture of responsibility with respect to environmental stewardship and animal welfare, and are active participants in managing the biosecurity risks associated with the pet trade;
- pet owners and traders know which pet species may be legally kept and traded;
- action will be taken against individuals engaging in illegal activities, such as trading in illegal species.

Tools and opportunities to manage biosecurity risks

PREVENTATIVE MANAGEMENT

The desired future state is to prevent pet animals and diseases from establishing populations in the wild. Preventing the ways by which captive animals are transferred into the environment is best considered through managing the pathways. Pathway management tends to focus on the behaviours and actions of the people who facilitate animal transfers, rather than having a primary focus on managing the animals directly.

A precautionary approach is also anticipated in the regulatory framework²⁴.

Some advantages of a preventative pathway management approach include;

- Prevention is cost effective (Morfe and Weiss 2008, Harris and Timmins 2009).
- Prevention avoids the need for less desirable interventions later (e.g. killing animals).
- Pathway management can proceed in the face of uncertainty regarding species and their associated risks (Ruiz and Carlton 2003).
- Being a people-based rather than species-based approach, pathway management is ideally suited to an inclusive and collaborative management model.
- Positive behaviour change can complement regulatory intervention by lowering demand for inappropriate and illegal species and increasing reporting of illegal activity.

International initiatives also use collaborative approaches to develop pathway management tools relevant to the pet trade. Case study 8 (Appendix 1) demonstrates a substantial recent initiative to develop a pet trade pathway toolkit, together with an ongoing awareness campaign “*Habitattitude*” by the Pet Industry Joint Advisory Council.

²³ The statements presented attempt to capture the views of technical and workshop participants contributing to this report. While this may assist towards policy development, it does not comprise a policy statement.

²⁴ E.g. Section 7 HSNO Act, section 42 Biosecurity Act.

Preventative management is not the only approach to managing risks associated with the domestic pet trade however. The following discussion considers regulatory and non-regulatory tools separately, while some synergies will exist between these.

REGULATORY TOOLS

With respect both to the legal barrier to importation of most pet species, and uncertainty in relation to “new organism” status of some species, development of additional IHSs might deliver some benefits. For example, the IHS for ornamental fish achieved several useful outcomes. Firstly, it provides a legal avenue for ornamental fish traders and enthusiasts to import fish species subject to prescribed risk management procedures. Secondly, the process resolved uncertainty in relation to new organisms under the HSNO Act, in that an exhaustive list of exotic fish species believed to be present in New Zealand prior to 29 July 1998 was compiled.

Subject to the outcomes of a separate species risk assessment process, additional species could be classified as either unwanted organisms or pests under the Biosecurity Act. Further consideration might be given to permitted ownership of some higher risk species. The chinchilla example in the Southland region demonstrates that this approach is possible under current biosecurity legislation at least in principle.

This will still leave the majority of pet species subject to virtually no regulation at all. The Animal Welfare Act provision relating to abandonment of animals is insufficient to clearly establish in legislation that release of any pet animal into the environment poses biosecurity risk and should not be done. Legislative change which unequivocally prohibits release of pets into the wild might be considered.

Uncertainty associated with the variability between regional pest management strategies generally reflects true variation between regional pest issues and community aspirations. There may however be scope for improved harmonisation among regional strategies.

NON-REGULATORY TOOLS

A range of non-regulatory tools are potentially available. Some of these tools also have a regulatory element;

- **Public awareness.** Effective pathway management is largely a social exercise. Most New Zealanders want to do the right thing and recognise their duty of care in matters of our common environmental and economic welfare. Together with practical guidance as to how their activities might be modified, risk reduction is achievable. The “Weedbusters” initiative demonstrates this principle (Case study 7, Appendix 1). For the pet trade, simple values based messaging might aim to communicate concepts such as:
 - The New Zealand environment is a special place. Newly established exotic animal species or diseases are likely to do harm, to the environment, economy, human health and lifestyles and therefore pets must never be released, abandoned or allowed to escape.
 - Abandoned animals will often suffer.
 - Illegal activity should be reported.

And support that primary messaging with practical advice, including:

- which species may be legally held and traded;
- which pet species are practical to care for and environmentally friendly;
- where pets can be taken when they are no longer wanted;
- advantages of dealing with established and certified traders.

Consistent messaging can potentially be delivered via all of national and regional authorities, the trader sector, and the pet trade support sectors.

- **Codes of practice.** Codes of practice (COP) are industry led initiatives which can include explicit and practical ways to manage biosecurity risk. For example the Pet Industry Association currently has a Code of Welfare. Such codes could potentially include guidance for appropriate pet selection, pet care and welfare (including the adverse welfare effects of abandonment), biosecurity risks associated with release and escape of pet animals, and guidance on practical alternatives to dispose of pets which are no longer wanted.
- **Certification of traders.** Certification may provide marketable advantage to traders who subscribe to a “culture of responsibility”. This could be built into a wider pet trade certificate. The Companion Animal Council is presently considering certification. Certification can help consumers identify responsible traders.
- **Voluntary restriction of trade.** No industry endorsed agreement exists domestically restricting the sale of any pet species. This is in contrast to the National Pest Plant Accord (NPPA), an agreed list which prohibits the sale of “weedy” plant species²⁵ (Case study 6, Appendix 1). Whether such an approach is appropriate for the pet trade industry is not clear, as it is perceived that most traditional pet shops are not trading in high risk species at present. And it may be that higher risk species are appropriately dealt with using regulatory tools. If such an approach does prove to be useful, it is likely to comprise a limited species list²⁶.
- **Amnesties** (surrender of illegal species). Amnesty programmes may be useful in support of public awareness initiatives, or following a change in legal status of particular species, providing an option for illegally held species to be surrendered without penalty. Such programmes can help to demonstrate commitment and good faith in support of messaging initiatives which encourage people to know and do the right thing. Amnesties can also be considered a regulatory tool insofar as it operates as a temporary exemption from regulation.
- **Breeding management** (same gender or de-sexing programmes). Breeding management initiatives may be particularly useful for traders where the consumer market continues to demand pet species which pose relatively high biosecurity risk, but are legally able to be kept nonetheless. This type of initiative may be incorporated into relevant industry COPs.
- **Partnerships.** The pet trade system involves a range of participants and agencies having some form of jurisdiction, responsibility or interest in managing associated biosecurity risk. Partnerships are a good way to determine which regulatory and non-

²⁵ While the NPPA is an agreed list, all species listed are included on the unwanted organisms register, thereby placing ongoing management directly in the regulatory environment.

²⁶ The identification of high risk pet species is the focus of a separate project, and its outcomes are unknown at this time.

regulatory options should be agreed, implemented and managed. Acting collectively is identified as a key area for improvement across New Zealand's biosecurity system (MPI 2011).

- **Replacement.** Encouraging sound initial pet choices. Species may be illegal, pose high biosecurity risk, or be challenging for the potential owner to manage in the long term (too large or long lived, aggressive, noisy, high breeding rates etc). In contrast to prohibitive management, proactively offering more suitable alternatives may be a suitable first step. The "Weedbusters" regional publications and "Plant me instead" are excellent examples that facilitate the replacement of high risk species for low risk species to reduce spread of weedy species (case study 6, Appendix 1). These publications enjoy a wide uptake in the consumer sector and are a constructive counterpart to the prohibitive management approach of the National Pest Plant Accord.
- **Hygiene.** Keeping it clean minimises disease and other welfare problems. Transfers of animals should aim to prevent the inadvertent transfer of 'hitchhiker' organisms such as terrestrial or aquatic weeds, parasites, and pathogens.
- **Pet re-homing services.** Currently pets which are no longer wanted may be taken back to traders or rescue organisations. In some instances these agencies may not be able to take the animals, or alternatively are only able to offer euthanasia, an option unacceptable to many pet owners. Provision of additional re-homing services may alleviate the motivation to release pets into the environment. The Auckland Council offers a re-homing service for some higher risk species (birds and reptiles).

SPECIFIC OPPORTUNITIES IDENTIFIED

While all the regulatory and non-regulatory tools identified should be considered, a number are likely to be particularly useful. These either leverage off existing initiatives and practices, or comprise new initiatives.

- Maintain commitment to collaborative action.
- Facilitate awareness with consistent and values based messaging.
- Facilitate relevant industry codes of practice.
- Facilitate certification.
- Facilitate availability of re-homing options.
- Consider development of additional IHSs.
- Subject to the outcome of species risk assessments consider prohibiting high risk species using existing regulatory tools, or manage these species more closely (e.g. permitted ownership, same gender or de-sexing programmes).
- Monitor internet and other private trading portals for trade in illegal species.
- Facilitate public reporting of suspected illegal activity (e.g. 0800 report line).

Conclusions

The majority of pet owners and traders behave responsibly with respect to animal welfare and the biosecurity risks pets pose. New Zealand is fortunate that the range of pet species available on the domestic market do not include many of the problematic pet species available elsewhere in the world.

Nevertheless, some pet animals escape captivity, or are released or abandoned. Whatever the motivation, it is perceived that this is in part due to a lack of awareness of welfare and biosecurity risk. Any transfer of pet animals from captivity into the environment poses some risk. Either the animals themselves may thrive and potentially establish pest populations, or there may be risk with associated “hitchhiker” organisms or disease.

Trade or possession of new organisms is prohibited, which effectively limits the domestic pet trade to species available in New Zealand prior to 29 July 1998. Of those, some higher risk species are managed under the Biosecurity Act either as pests or unwanted organisms, with scope to similarly classify additional high risk species if required. However, the majority of pet species are not classified as pests or unwanted organisms, and can be kept and traded without restriction.

Opportunities exist to better manage risks associated with both legally and illegally traded species. Without losing sight of the importance of regulatory tools in targeting high risk species and illegal activity, there is scope to better utilise non-regulatory tools in dealing with ongoing systemic biosecurity risks posed by the domestic pet trade.

Appendix 1: Case studies

CASE STUDY 1 - RAINBOW LORIKEET, PET BECOMES PEST

Rainbow Lorikeet Response



Photo: G van Meeuwen (DOC)

The rainbow lorikeet is a popular pet species in New Zealand. They were unlawfully and deliberately released in Auckland throughout the early 1990's by an Auckland resident trying to establish a wild population, in the belief that the birds would benefit New Zealand and make it more attractive for tourists.

In Perth, Western Australia, the rainbow lorikeet population started from fewer than 10 cage birds released in 1968 and has grown to 20,000 in number. The birds have found their way from the city to nearby commercial fruit areas and are now causing significant damage to the fruit growing industry. In New Zealand the rainbow lorikeet poses an additional threat by competing with endemic honey eaters such as tui and bell bird.

In order to manage these threats in New Zealand, in 1999, the rainbow lorikeet was declared an Unwanted Organism under the Biosecurity Act 1993. By way of an exemption, the birds may still be sold and kept as pets in secure aviaries and cages but there are heavy penalties for intentional releases into the wild.

They are currently managed by the Ministry for Primary Industries in partnership with the Department of Conservation and regional councils, with well over 200 birds recovered from the wild since the response operation began. Auckland Council has included the rainbow lorikeet in their Regional Pest Management Strategy.

For more information see: <http://www.biosecurity.govt.nz/pests/rainbow-lorikeet>

CASE STUDY 2 – CHYTRID FUNGUS KILLS NATIVE FROGS

Half of Frog Zoo Colony Dies



Archey's frog, *Leiopelma archeyi*

By Eloise Gibson. NZ Herald 4:00 AM Saturday Mar 28, 2009

Researchers are struggling to stop deaths of native frogs being kept in captivity in case the wild population dies out. Out of 83 Archey's frogs kept at Auckland Zoo since March 2005, 42 have died. The frogs have been kept inside to protect them from chytrid fungus, which has wiped out some Australian frog species and has started killing New Zealand frogs. [The fungus is thought to have arrived with imported pet frogs, Derraik and Phillips 2010]. At 37mm long, Archey's frogs are the smallest of New Zealand's four remaining native frogs. They live only in moist, misty areas of the Coromandel and in one site west of Te Kuiti.

DoC classifies them as "nationally critical" - its highest threat category. The captive breeding programme was planned after the frog population at a Coromandel monitoring site plunged 88 per cent in the mid-1990s, probably because of the chytrid fungus.

CASE STUDY 3 – PSITTACINE BEAK AND FEATHER DISEASE

Native parrots infected with exotic disease



Photo: Auckland Zoo

PBFD infected red-crowned parakeet

Psittacine Beak and Feather Disease (PBFD) is an infectious viral disease that only affects parrots.

The disease has been reported in more than 60 parrot species worldwide. Currently there is no vaccine. The virus is commonly found in aviary-kept parrot species all over New Zealand. In the wild, the virus is known to be widespread in the North Island amongst exotic parrots, such as sulphur-crested cockatoos and eastern rosellas.

PBFD has been confirmed in a native wild parrot population: red-crowned parakeets (also known as kakariki) on Hauturu-o-Toi/Little Barrier Island in 2009. This is the first report of PBFD in a population of native wild parrots in New Zealand. All native parrots (many of which are classified as nationally critical or endangered) are potentially at risk from the emergence of this disease.

Information and photo reproduced from:

<http://www.doc.govt.nz/publications/conservation/threats-and-impacts/wildlife-health/psittacine-beak-and-feather-disease-a-threat-to-our-native-parrots/>

CASE STUDY 4 – INCREASED ONLINE TRADE

Online trade threatens biosecurity in New Zealand

(reproduced from Derraik and Phillips 2010)

“There are several recent examples illustrating the numerous threats posed by online trade in New Zealand. In late 2006, 16 lizards illegally smuggled into the country were seized from various locations after it was discovered these were being sold on Trade Me (New Zealand-based equivalent of eBay). The species being sold online included eight iguanas (*Iguana iguana*), two emerald tree monitors (*Varanus prasinus*), five Chinese water dragons (*Physignathus cocincinus*) and a blue tree monitor (*Varanus macraei*). The latter is a rare species and, following arrangements with Indonesian authorities, it was returned to that country, but the other species had to be euthanized for biosecurity reasons (ERMA NZ 2007). The emerald monitors were found to be infected with a protozoan (*Hepatozoon* sp.) absent from New Zealand. Such parasite could pose a threat to endemic reptile species, such as the tuatara (*Sphenodon guntheri*) that is classified as vulnerable in the IUCN Red List of Threatened Species (IUCN 1996). The iguanas were also found to be infected with a *Salmonella* serotype not present in New Zealand. A barrier to enforcement against a number of species is that those with populations established in New Zealand before legislation came into effect are legally exempt from biosecurity regulations, unless authorities officially declare that action is required against a particular organism. Thus, the movement and the consequent spread of potentially invasive organisms within New Zealand is also a significant biosecurity issue. An invasive species may have a restricted distribution within the country for a variety of reasons (e.g. its spread being hindered by environmental barriers), and pet traders using online auctions to sell such animals are making them more popular and accessible, ultimately facilitating further introductions to the wild and invasion of more suitable habitats. One such case is the red-eared slider (*Trachemys scripta elegans*), which is included in the World Conservation Union (IUCN) list of 100 of the world’s worst invasive species (Lowe et al. 2000). This species is a very popular pet worldwide, being ‘mass-produced’ in the USA for the international trade (Cadi et al. 2004). In New Zealand it seems to be one of the most affordable and easily obtained exotic reptiles (Kikillus et al. 2009). Isolated populations of the species have been found in the wild in New Zealand (Thomas and Hartnell 2000; Dykes 2007), and climatic models indicate that a number of northern areas are suitable for its establishment (Kikillus et al. 2009). Some regional authorities now classify *T. s. elegans* as pests, and are advocating that research is carried out to determine whether they are likely to become invasive in New Zealand (Kikillus et al. 2009). In the meantime, unrestricted online trade means that it is likely that feral populations may become more widely established, and consequently affect native freshwater environments. Another example is the online sale of introduced frogs that are already established in New Zealand. Although it is illegal to release these animals into waterways, this does not prevent people from doing so once they tire of their pets. This is of concern for biosecurity and conservation authorities as the pet trade of tadpoles is facilitating the spread of the chytrid fungus *Batrachochytrium dendrobatidis* around New Zealand (Waldman et al. 2001).

This fungus has been responsible for massive morbidity and mortality in amphibian populations worldwide, and the movement of infected animals by trade appears to be the primary cause of its spread (Johnson and Speare 2003). In New Zealand, *B. dendrobatidis* is likely to be implicated in the decline of endemic frog species, which were already under threat (Bell et al. 2004; Waldman et al. 2001). The sale of genetically modified organisms is another problem. Such organisms are regulated by New Zealand’s Hazardous Substances and New Organisms Act 1996 and cannot be imported or released in New Zealand without approval from the Environmental Risk Management Authority. In 2007 MAF Biosecurity New Zealand (MAFBNZ, the country’s lead biosecurity agency) launched an investigation after members of the public reported the online auction of brightly coloured zebra danios (*Danio rerio*) suspected to be genetically modified organisms. Laboratory testing confirmed their GMO status, and MAFBNZ tracked down and subsequently destroyed over 200 hundred specimens (Loughnan et al. 2007). The aquarium trade appears to be the main driver behind the increased biosecurity risks associated with the internet trade. The New Zealand Biosecurity Strategy recognized the internet mail order of marine organisms as a particular threat (Biosecurity Council 2003), citing as an example the invasive seaweed *Caulerpa taxifolia*. This species is readily available over the internet, and can be easily ordered from overseas. Its introduction and spread in coastal waters in many areas of the world had dramatic ecological and economic consequences, and it seems that its release from aquaria has been responsible for most, if not all, of the major *C. taxifolia* invasions (Walters 2009). The illegal importation or movement of potential invasive species within, or into the country poses a threat not only to environmental, social and economic values but also to human health. The Malaysian trumpet snail (*Melanoides tuberculata*) for example, was relatively recently found to be established in New Zealand (Duggan 2002). Overseas, *M. tuberculata* is the intermediate host of a number of trematodes that are human parasites (Derraik 2008), and it is believed to have been released into the New Zealand environment from aquaria (Duggan 2002). Its distribution until recently was thought to remain limited to geothermal waters in the central North Island, but recent data indicate that it is more widespread than previously thought. *Melanoides tuberculata* has been sold widely on online auction site Trade Me, which may account for its spread to other locations. Another example is the previously described illegal importation of iguanas infected with an exotic *Salmonella* serotype. Reptiles are widely recognized as common sources of *Salmonella* infection to humans, as demonstrated by frequent case reports worldwide, particularly in North America (Mermin et al. 1997; Woodward et al. 1997; CDC 2003). There are numerous *Salmonella* serotypes/phages overseas that are not present in New Zealand, and although these usually cause gastroenteritis, *Salmonella* infection may be associated with serious human disease such as septicemia and meningitis (Mermin et al. 1997; CDC 2003). As a result, the arrival of such exotic human pathogens into New Zealand in association with illegally imported reptiles is a human health concern.”

CASE STUDY 5 – ILLEGAL IMPORT OF WHITE’S TREE FROGS

Frog Fine

Tuesday, 22 June 2010, 3:13 pm
Press Release: MAF Biosecurity New Zealand

A local man has pleaded guilty in the Auckland District Court to charges of illegally possessing a type of frog rarely found in New Zealand.

Haisley Pace, a collector and breeder of frogs and lizards, was discharged without conviction but ordered to pay investigation and court costs totalling \$10,000.00, after his court appearance last Friday.

Mr Pace was charged under the Biosecurity Act 1993 after Ministry of Agriculture and Forestry (MAF) officials received information from a member of the public that suspected White’s Tree Frogs were being advertised for sale online.

A MAF investigation confirmed the identity of the frogs and a search warrant was issued at Mr Pace’s home to locate the frogs and find out more about their importation. Investigators found an adult pair of White’s Tree Frogs onsite, a number of juvenile frogs, and confirmed that none had been sold or ever left the property.

When interviewed, the defendant admitted he had suspected the frogs were unauthorised goods and couldn’t provide any detail about their importation. To date, MAF has not been able to specifically determine their source. White’s Tree Frogs are a species commonly found in Australia and were introduced to New Zealand in the late 19th century. There was, however, never evidence that any survived. Although the frogs are known to sometimes reach New Zealand they have never been able to naturalise and there are no known wild populations of the frog.

MAF Enforcement Director Jockey Jensen said the result illustrates how seriously New Zealand takes biosecurity.

“Importing and illegally possessing risk goods like this increase New Zealand’s exposure to potential impacts on our environment, health and biodiversity”.

“If we are going to protect this country’s unique biodiversity we must all be vigilant about preventing unwelcome imports that may carry a risk of introducing a pest or disease into the country and ensuring we report anything unusual.”

All imports of pests and animals must be cleared by MAF. Clearance is necessary to protect against the introduction of unwanted pests and diseases that could seriously affect New Zealand’s environment. Exotic animals may contain dangerous diseases and many viral diseases are transmittable through the movement of exotic pets.



White’s Tree Frog, *Litoria caerulea*

CASE STUDY 6 – BLACK LIST VERSUS WHITE LIST APPROACHES

The National Pest Plant Accord (NPPA) and “Plant Me Instead” publications

NPPA

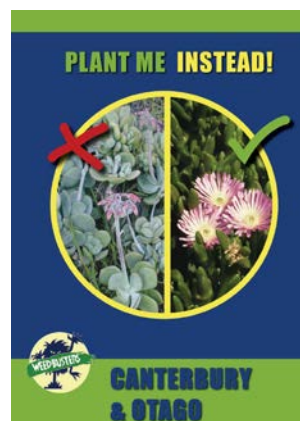
The NPPA has been in force since 2001, its primary purpose to reduce the sale of weedy species via retail nurseries pathway.

It is a voluntary initiative in that the species on the list are agreed between the stakeholders, the Nursery and Garden Industry Association, Regional Councils and government departments. However, it is also a regulatory tool in that once agreed, the species are declared “unwanted organisms” under the Biosecurity Act 1993 which prohibits the plants being sold, propagated or distributed. The NPPA demonstrates the value of a partnership approach to achieve high levels of voluntary compliance among retailers, and improved awareness of potential weed problems among consumers.

However, a “black list” of “bad plants” such as the NPPA prescribes may lead people to assume that any plants not on the list must be “good plants”, i.e. low risk. This is not necessarily true, and neither is it particularly helpful with respect to deciding what one can safely plant. It may be useful to give people further certainty as to which species are environmentally friendly. A “white list” of plants for aquaria and ponds already exists for New Zealand (Clayton et al 2008), and regional “Plant me instead” publications are now complete for some regions.

Plant me Instead

These “Weedbusters” publications comprise a “white list” and are an example of a replacement management strategy. They rely on local expertise to develop a list of undesirable species (irrespective of whether or not they occur in a Pest Management Strategy or the National Pest Plant Accord). For each weedy species, alternative species unlikely to be weedy are suggested, both exotic and native species. These publications are freely available and with the visual appeal of the full colour photos have proven to be both practical and popular.



CASE STUDY 7 – RAISING AWARENESS AND PROVIDING PRACTICAL ADVICE IS EFFECTIVE

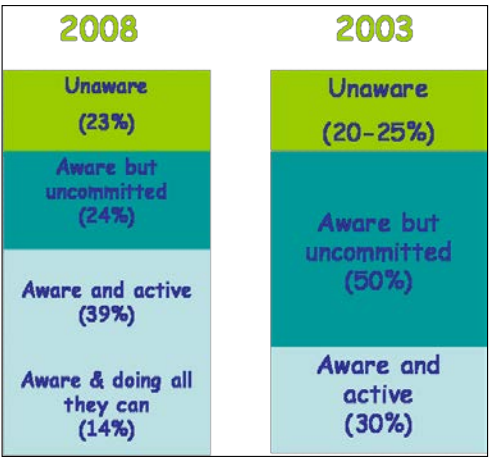
WeedBusters

Weedbusters comes under the umbrella goals of the New Zealand Biodiversity Strategy. The Vision for Weedbusters is:

New Zealanders are aware of and taking action to reduce the impact of weeds on the environment, economy and human health.

Weedbusters is a weeds awareness and education programme that aims to protect New Zealand's environment from the increasing weed problem. Pest animals and plants (weeds) are the greatest threat to New Zealand's biodiversity. Weedbusters aims to educate people and raise awareness to turn this problem around. Weedbusters means action - taking part in weed issues is essential to limit the spread and establishment of weeds.

Public perception of weed issues was surveyed by AC Neilson in 2003 and again in 2008. These surveys demonstrate a significant and positive shift in societal views on weed issues. During this 5 year period the Weedbusters program was the only significant national initiative promoting weed awareness and behavioural change. Many now acknowledge that people are the main cause of weed spread, recognise their personal responsibility, and are making positive behavioural changes leading to action.



CASE STUDY 8 – INTERNATIONAL COLLABORATION DEVELOPS PATHWAY MANAGEMENT TOOLKIT



The Pet Industry Joint Advisory Council (PIJAC) is a nonprofit, service-oriented organization comprised of Members who care about pets, the pet industry, and the environment. [US and Canada based].

PIJAC's mission is to:

- PROMOTE** responsible pet ownership and animal welfare
- FOSTER** environmental stewardship &
- ENSURE** the availability of pets

For more than 40 years, PIJAC has served its Members and mission through world-renowned advocacy, animal care programs and environmental stewardship campaigns.

Pet Trade Pathways Toolkit

Invasive species (harmful non-native organisms) are a major threat to native wildlife and habitats. The pet/aquaria trade has been identified as a source of potentially invasive species. Pets that have escaped or been released can become predators or competitors with native wildlife, as well as spread disease or parasites. In addition, aquaria dumping and water gardening can become a source of invasive plants.

In order to minimize this invasion risk, the Parties to the Convention on Biological Diversity (CBD) adopted the decision in 2008 to study best management practices that industries, governments, and others are taking to prevent the release, escape, and establishment of former pets and aquaria species.

As a result, the Pet Industry Joint Advisory Council and the Global Invasive Species Programme (GISP) worked collaboratively to create the Pet Pathway Toolkit.

Habitattitude™ is a proactive [education/awareness] campaign designed to:

- Ensure that pets are thoughtfully chosen and well-cared for (**Habits**)
- Protect the natural environment (**Habitats**) from the impacts of unwanted pets
- Help pet owners find alternatives to the release of their pets (**Attitudes**)



Do right by your pet. Do right by our environment.

Habitattitude™ inspires and educates people to be both responsible pet owners and environmental stewards, reducing the impact of invasive species on the environment, economy, and human health.

Millions of unwanted pets are released into the natural environment each year. Cats, fish, and reptiles are the most commonly released pets.

Many of these abandoned pets do not survive for very long--they are often unable to find adequate food or shelter, or they fall victim to other animals, people, and auto traffic.

Abandoned pets that do survive can cause significant harm to the environment by preying on or competing with native fish and wildlife, spreading disease and parasites, and destroying fragile habitats. In short, they can become invasive species: non-native species that cause harm, or have the potential to cause harm, to the environment, economies, and/or human health.

Invasive species are now among the top environmental problems worldwide.

Invasive species cost the U.S. more than \$100 billion per year, approximately \$1,100 per year, per household.

Together we can make a difference!

For more information see www.pijac.org

Appendix 2: Subject matter expert participants

I acknowledge the valuable input from the following people in helping to capture the current state of the pet trade system in New Zealand.

Workshop participants

Jill Fraser, New Zealand Pet Industry Association
Phil Bell, Biosecurity, Department of Conservation
Wendy Jackson, CITES, Department of Conservation
Ann Panoho, Wildlife Enforcement Group, Ministry for Primary Industries
David Cooper, Maharangi Technical Institute / Companion Animal Council
Ewan Kelsall, Biosecurity, Greater Wellington Regional Council
Geoff Ridley, Environmental Protection Authority
Sue Blaikie, New Zealand Veterinary Association. / Companion Animal Society
Vicky Melville, Animal Imports, Ministry for Primary Industries
Darren Stevens, Federation of New Zealand Aquatic Societies
Jaap Knegtmans, Biosecurity, Ministry for Primary Industries

Further Contributors

Mary-Lee Slone, New Zealand Parrot Society
Jill Hingston, President, New Zealand Herpetological Society
Erik Van Eyndhoven, Biosecurity, Ministry for Primary Industries
Jack Craw, Biosecurity, Auckland Council

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Appendix 4: Relevant website links

Pet Industry Joint Advisory Council. <http://www.pijac.org/>

Habitattitude – Protect our environment. <http://www.habitattitude.net/>

Boston Herald. *Owners turn in pets too exotic to handle.*

http://www.bostonherald.com/news/national/south/view/20111106owners_turn_in_pets_too_exotic_to_handle/srvc=home&position=recent

British Broadcasting Corporation. *Killer frog fungus “spread by trade”.*

<http://www.bbc.co.uk/news/science-environment-15624254>

Animal and Plant Health Inspection Service. *Biosecurity for Pet Birds.*

http://www.aphis.usda.gov/animal_health/birdbiosecurity/biosecurity/petbirds.htm

Birds n Ways. *Exotic Newcastle Disease.*

<http://www.birdsnways.com/newcastle/endtrans.htm>

International Air Transport Association. *Invasive species: The Pet Trade Pathway Toolkit.*

http://www.iata.org/whatwedo/cargo/live_animals/pages/toolkit.aspx

Discovery News. *Pet trade introduces diseases, costs.*

<http://news.discovery.com/animals/swine-flu-animal-trading.html>

About.com. *Exotic Pets Returned to the Wild.*

<http://exoticpets.about.com/cs/resourcesgeneral/a/exoticsrelease.htm>

Live Science. *Exotic Pets Turn Invasive, Threatening Florida.*

<http://www.livescience.com/16204-florida-invasive-reptiles-amphibians.html>

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<http://www.peconicestuary.org/InvSpStewardship.html#InvSpPet>

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